COMPUTERWORLD

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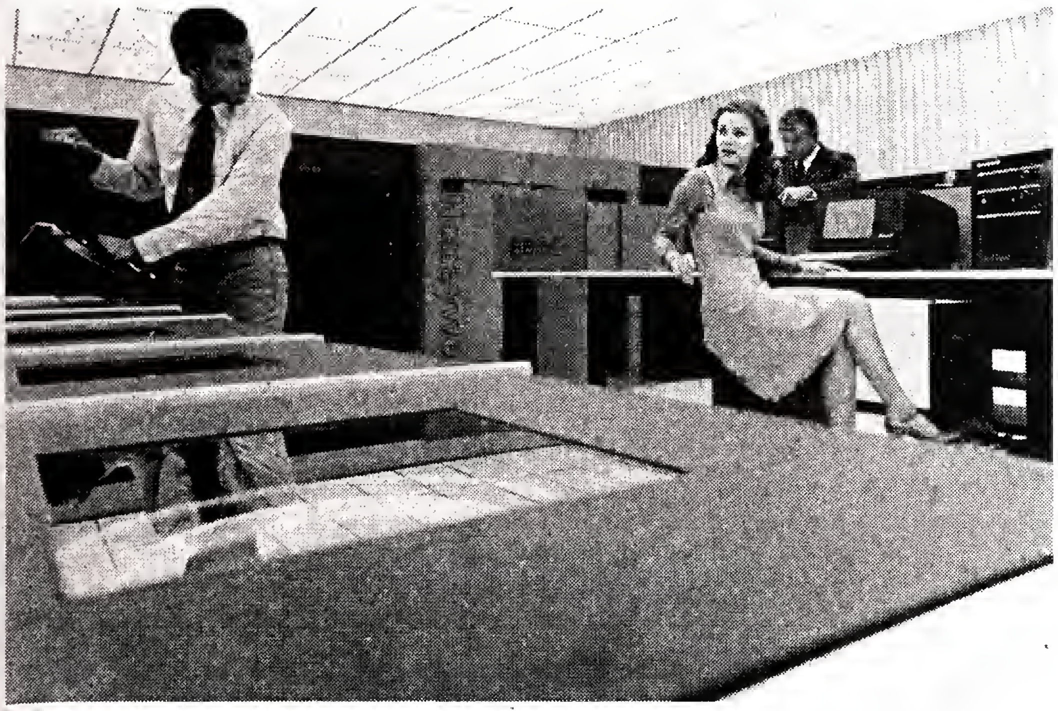
NEWSPAPER



The 66/85 reportedly provides 50% more throughput than the 66/80.

HIS Targets Four Systems At Large Distributed Users

By Esther Surden
Of the CW Staff

NEW YORK — Honeywell Information Systems, Inc. (HIS) bombarded the large system distributed processing user with an array of CPUs and communications options last week.

The 66/85, a top-of-the-line large-scale system, and three medium- to large-scale CPUs, the 64/60, 64/50 and 64/30, were announced.

Also introduced were the Datanet 6678 front-end network processor, the DST 6/500 intelligent terminal, the RBT 6/300 remote batch terminal system and the VIP7700R CRT.

The 66/85, which will be available in the third quarter, is said to provide 50% more throughput than the company's 66/80 system. It is fully program-compatible with other Series 60 Level 66 hardware, a spokesman claimed.

The system's microprogrammed CPU is responsible for program execution and computations as well as memory protection

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IBM Admits Knowing What Lurks in Mind Of the Shadow Jury

By Molly Upton
Of the CW Staff

LOS ANGELES — Despite earlier denials, IBM has admitted it hired a "shadow jury" to sit in during the antitrust case filed against it by California Computer Products, Inc. (Calcomp) [CW, Jan. 24].

IBM attorneys received daily "notes" from debriefings of the members of the shadow jury, apparently in order to plan questioning strategy and tactics.

"Under the circumstances, the study will probably be terminated," an IBM spokesman said.

In explaining the reasons for the shadow jury, the spokesman said "IBM attorneys have been concerned that the factual complexity of the Calcomp case was beyond the comprehension of a jury and then moved unsuccessfully to strike the jury on that ground.

"In an effort to gain more knowledge, IBM attorneys discussed their concern with qualified professionals who were interested in doing research related to this problem.

"IBM outside counsel arranged to fund

(Continued on Page 6)

White House Advisers Urge National Information Policy, Cite Merging Technologies

By Nancy French
Of the CW Staff

WASHINGTON, D.C. — The country needs a coordinated national information policy.

That recommendation was released recently in a report to the President by the Domestic Council Committee on the Right of Privacy.

The report focused on technology, how it is changing the nation's economy and business style and, conversely, how it is diminishing the individual's right to have and control information.

The recommendation sounds simple, but its implications are staggering.

Today, one-third to one-half of the nation's gross national product is derived from the production and distribution of information and knowledge. The U.S. has entered the "information age," the report said.

Congress, the Federal Government and technology experts are struggling to cope with the problems spawned by the impact of technology in an "ad hoc," "piecemeal" manner and without the benefit of a comprehensive overview of the field.

In recent years, Congress alone has established at least eight commissions to consider such issues as privacy, electronic funds transfer, copyright law, electronic surveillance, libraries and information science.

Activity within the executive branch has reflected a similar pattern, the report said.

But this approach is wrong, the report indicated and proposed, instead, the creation of an interagency council on information policy.

The council would consist of a full-time chairman and high-level representatives from the federal agencies to develop policy that is "comprehensive, sufficiently sensitive to new technology and responsive to the implications of the information age."

In addition, the report recommended an advisory committee whose members would be drawn from the private sector, local government and the academic and professional disciplines concerned with the information policy issues.

The committee recommended a single advisory organization in one place for a number of reasons.

First, information policy issues are interrelated so that action taken in one area can have an effect in others.

Second, by treating problems in concert,

(Continued on Page 4)

The BC/7 is available with industry-oriented applications.

BC/7 Marks Univac Decision To Pursue Small Business Mart

By Esther Surden
Of the CW Staff

NEW YORK — Univac entered the crowded small business arena here last week with a modular, microcomputer-based system in the range of the IBM System 32 and the Burroughs Corp. B80.

Available in April, the BC/7 features software designed for "ease of operation by noncomputer-oriented personnel," Univac claimed.

The vendor is currently offering industry-oriented applications packages for wholesale distributors and manufacturers.

Although the BC/7 is presently not compatible with Univac mainframe offerings, an upgrade path is planned in the near future, a spokesman noted.

All BC/7 hardware components are arranged along a single data bus. The control processor unit for the system is an Intel 8080A-type 8-bit microprocessor on a single chip.

A second microprocessor containing macro instructions enhances the system's program execution time, according to the spokesman. Minimum instruction time is 2 microsec.

Memory is MOS, expandable from a

(Continued on Page 6)

Court Quashes Delay, Tariff for Dataspeed Finally Takes Effect

By Ronald A. Frank
Of the CW Staff

NEW YORK — The often-delayed interstate tariff for the AT&T Dataspeed 40/4 went into effect last week after a federal appeals court here refused to grant a further postponement.

A three-judge panel of the U.S. Court of Appeals for the Second Circuit heard oral arguments from the Computer & Communications Industry Association (CCIA), IBM, the Federal Communications Commission (FCC) and AT&T on a petition to delay the tariff.

The CCIA told the court the FCC had approved the tariff because it found the Dataspeed 40/4 was not a DP device since it did not actually perform the operations of a CPU, even though it needed a CPU in order to operate.

CCIA attorney Terry Mahn questioned how the FCC could have determined the Bell terminal did not perform the functions of a CPU if the commission had never defined exactly what a CPU does.

If the FCC ruling on the Dataspeed 40/4 stands, AT&T will be able to "tack on any new device" up to a CPU and get it tariffed, Mahn told the court.

Asked by presiding Judge James Oakes what irreparable harm would be done if the tariff went into effect, Mahn said two firms, Memorex and Courier, would be immediately threatened with a loss of customers

(Continued on Page 4)

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Financial Plans Swiped

DPer Caught Ransoming Firm's Tapes

By Edith Holmes
Of the CW Staff

LONDON — A computer operations supervisor and his accomplice were nabbed by Scotland Yard here recently, squelching their demand for nearly half a million dollars in ransom for magnetic tapes said to contain the financial plans of one of their employers.

Police brought the caper to a close outside a men's clothing store on Oxford St. when they caught Rodney J. Cox and his accomplice in the act of picking up a suitcase supposedly holding the ransom money — some 275,000 British pounds sterling in old 10-pound notes, according to Scotland Yard.

Cox, 25, was a computer operations supervisor with responsibility for one shift at ICI's DP facility in Rozenburg, The Netherlands, according to the *Washington Post.* ICI, which was formerly called Imperial Chemical Industries, is Britain's biggest industrial concern with sales of $5.3 billion in 1975.

Cox, who had been passed over for a promotion at ICI, had grumbled openly about this decision and was fired effective Feb. 1, the *Post* reported.

In an apparent effort to achieve some retribution for his termination, Cox drove from his Dutch home to the Rozenburg DP center and picked up tapes and disks containing ICI's financial plans, the *Post* reported.

Accustomed to seeing DP people at all hours, security guards obligingly helped Cox load the loot into his station wagon, Scotland Yard said.

Cox then drove to ICI's European headquarters in Rotterdam, The Netherlands, to pick up a duplicate set of tapes, intended as a backup in case of such natural disasters as fires and floods.

He drove off with some 594 tapes and 48 disks, according to information obtained by the *Wall Street Journal.*

The next day, a Sunday, Cox called his boss, Geoffrey Cowling, told him what he had and demanded the ransom money, the police said.

Cowling was instructed to go to ICI's London headquarters and wait for a phone call and further instructions, Scotland Yard added.

Meanwhile, Cowling called his superiors at ICI who got in touch with the Dutch police. They called on Interpol and Scotland Yard in turn.

Proof of the Ploy Provided

Yard detectives briefed Cowling on Monday, sending him to ICI's London headquarters. He was instructed to demand proof that Cox actually had the tapes.

Cowling did so when the phone call came on Tuesday and Cox and his brother-in-law, Peter R. Jenkins, 26, who also happens to be a computer systems programmer, sent one tape by taxi to Cowling at ICI the next day.

At dusk the same day, another taxi arrived at ICI with instructions on where to deliver the ransom money, Scotland Yard said.

Cowling, equipped with a small police radio and carrying the suitcase containing the money, broadcast from the cab that he was headed for Oxford St. Unmarked police cars followed him to that area.

Cowling arrived just at 6 p.m. and stood waiting with the suitcase outside the fashionable Lord John Boutique. Three to four minutes had passed when a man on a motor scooter drove close to Cowling and made a grab for the suitcase.

With that, a dozen detectives, some dressed as street cleaners, tackled the scooter and its rider.

Scotland Yard would not say who was on the scooter, but shortly after the rider was captured, the police had both Cox and Jenkins in custody.

The Dutch police recovered the tapes and disks from rented cars parked at two airports and a harbor, according to the *Post.*

With the capture of Cox and Jenkins, the return of the property and the impending trial, ICI had "no comment" on the case and would not confirm that Cox was ever employed at Rozenburg.

At one point, the company insisted the tapes and disks didn't contain information all that valuable.

IBM, Sanders Reach Agreement

By Ronald A. Frank
Of the CW Staff

NEW YORK — IBM and Sanders Associates, Inc. reached an agreement here last week by which Sanders will develop "advanced computer-related products" for IBM.

In return, Sanders has agreed to drop its antitrust suit against IBM now pending in the U.S. District Court in New Hampshire.

IBM will pay Sanders $4 million over the next year for "applications of Sanders technology to be used in future IBM products." Additional payments of $3 million will be made for "certain minimum production commitments," according to a joint statement issued by the firms.

IBM will also pay Sanders $3 million for the purchase of certain products from its inventory. Also involved will be a grant to IBM of a "nonexclusive license to certain Sanders patents."

The lawsuit filed in January 1975 by Sanders charged actions taken by IBM against terminal products from Sanders Data Systems violated antitrust laws. The Data Systems division has been tentatively sold to Harris Corp., but as part of this pending sale Sanders reserved the right to pursue its litigation against IBM.

The Sanders development work for IBM will be done by Sanders Federal Systems, which is not affected by the sale to Harris.

The agreement is final and not subject to stockholder ratification by either firm, an IBM spokesman noted.

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HEAT

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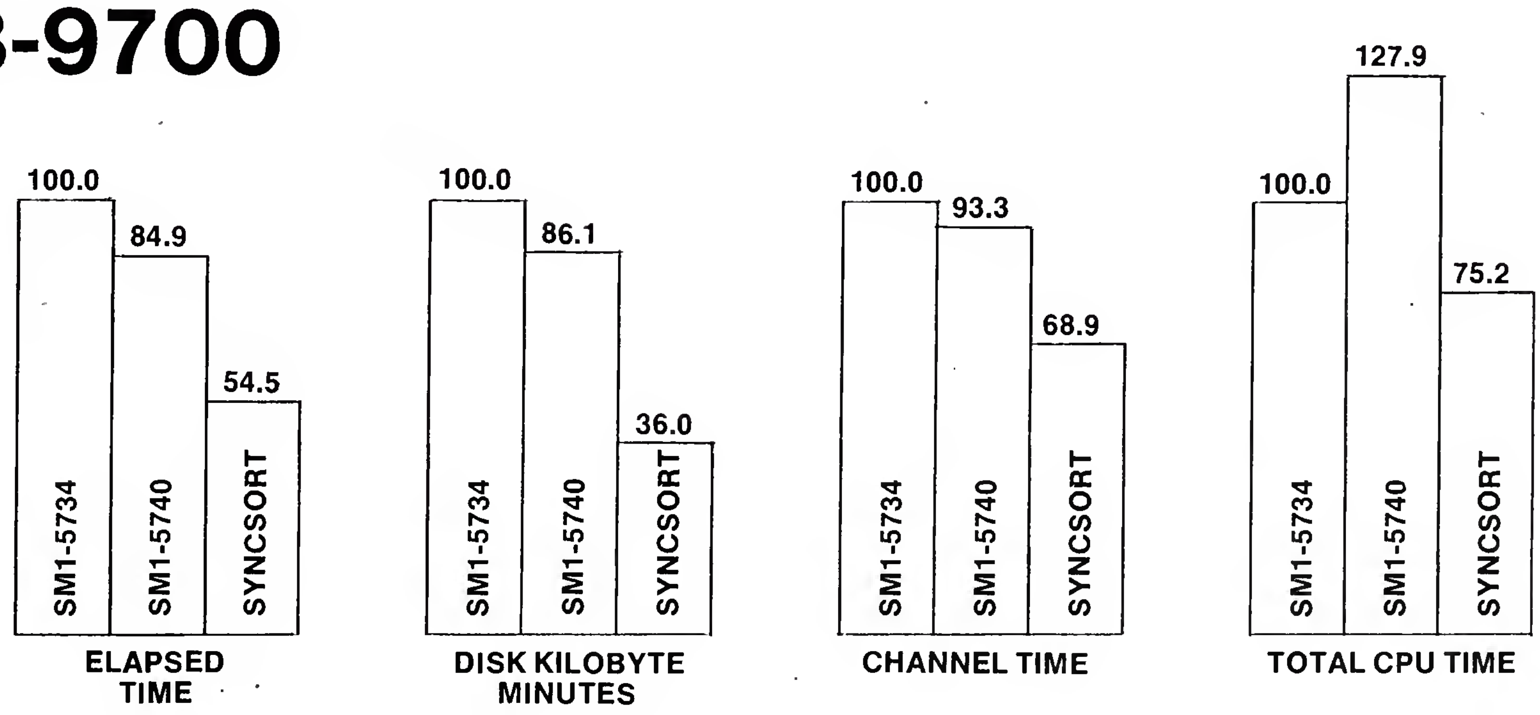

Sort Support was another reason. Users soon discovered that when they called us, a warm-blooded creature was at the other end of the line. When they called IBM, well . . .

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Is there hope for ICEMAN? Well, it's going to take a lot of cold weather. Maybe the Computer Giant will have to follow the practice used by certain ski-resort operators.

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Domestic Council Urges National Information Policy

(Continued from Page 1)

an office of information policy could develop strong and sustained policy skills, take maximum advantage of related experiences and minimize duplication.

Third, an office of information policy, established to advise the President in these areas, could prevent information concerns from being compromised.

Impact of Technology

The advent of computer and communications technology is causing a quiet revolution in the field of information, according to the committee.

"It is quiet because the signs of change are subtle and not always visible," the report said, but "it is a revolution because the rate of change is very rapid."

Although information technology has made life easier for many people, it has brought problems as well as opportunities.

The report cited inadequate protection of the individual's privacy, ineffective handling and retrieval of information, incompatibility of computerized information systems and uncertain relationships between public and private sector groups involved in information activities.

Information technology has created an "exponential increase in the volume of information flow" with observers estimating a four- to sevenfold increase by 1985.

The time and distance constraints on communications have shrunk and satellite communications today provide the long-distance capability to use computers and other information technology throughout the world, the report said.

Further, the nation is growing more and more dependent upon information and communications services with nearly a million computer terminals in the U.S. providing interactive on-line information service to their users.

The interdependence of previously autonomous institutions and services, such as libraries and other information centers, has also increased, and today they are being tied into resource-sharing networks that cross traditional jurisdictional lines.

Conceptional changes in economic, social and political processes have been induced by the increase of information and communication. A prime example is the projected impact of a checkless/cashless society as a result of electronic funds transfer, the report said.

Further, the "time cushion" between social and technical changes and their impact on daily life is decreasing.

Today there is no time to anticipate the impact of information technology applications before they become part of our everyday lives, the report said.

Role of Government

For more than three decades, observers have suggested the need for sharper governmental focus on information policy problems.

As a result of congressional and other attention to the problem, four major policy vectors — computers, communications, freedom of information and privacy and science information — are rapidly converging, the committee noted.

"Yet, sharp governmental focus has so far been elusive," the report said.

But with or without the committee, "consciously or unconsciously . . . by commission or omission," the nation will arrive at a national information policy.

The question is whether the government will attempt to take a considered, unified approach, the report said.

With the change in administration, it remains to be seen how the Carter Administration will react to the recommendations of the Ford Domestic Council's recommendations — particularly in light of the fact that the entire Domestic Council will probably be abolished.

However, some sources say the streamlined approach may appeal to the Carter team's philosophy of consolidation.

Tariff for Dataspeed Finally Takes Effect

(Continued from Page 1)

because of the Dataspeed's low price.

The Dataspeed 40/4 is priced as much as 66% below the price of the IBM 3270 CRT, he noted.

The CCIA attorney predicted that "hundreds of terminals" installed by independent suppliers would be displaced by the AT&T terminal and, as a result, competition would be destroyed.

When Oakes asked whether it was not in the public interest to have competition, Mahn replied, "The public has no interest in having competition destroyed through unfair practices. There is no evidence that AT&T is not cross-subsidizing [the price] of this device."

IBM Objects to Marketing

IBM was represented by Roger Wollenberg, who told the court his client was not objecting to the functions of the Dataspeed 40/4 but how it is being marketed.

The AT&T terminal should be introduced on an unregulated basis, "not from the haven of regulation," Wollenberg contended.

If necessary, the 1956 Consent Decree between the Justice Department and AT&T should be modified so AT&T can provide the Dataspeed 40/4 and other similar products in an unregulated environment. "We think it is a DP service," Wollenberg said of the AT&T terminal.

Speaking for the FCC was attorney Jack David Smith, who told the court that on four separate occasions the commission had reaffirmed the Computer Inquiry I rules under which it had approved the Dataspeed 40/4 tariff.

The FCC felt it had acted correctly in approving the tariff, but if the court decided to hold a hearing as requested by the CCIA and IBM, the commission would be ready with its response 25 days after the petitioners file their position papers, he said.

AT&T attorney Michael Boudin said "nobody will be driven to the wall" by the tariff. In 1975, about 130,000 terminals of the Dataspeed 40/4-type were in use; less than 3% of these were Bell terminals operating under intrastate tariffs, he said.

About 200 customers are interested in Dataspeed 40/4 service, he added, noting the Dataspeed 40/4 is priced 10% to 15% below IBM but higher than Memorex and Courier terminals.

The court is tentatively scheduled to hear arguments from the CCIA and IBM on whether the FCC violated its own Computer Inquiry I rules during the week of April 25. Briefs from the CCIA and IBM are due by March 14 and the FCC response is due on April 14.

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At West Coast Antitrust Trial

Calcomp Judge Silences IBM on Trade Secrets Issue

By Molly Upton
Of the CW Staff

LOS ANGELES — IBM has been barred — once again — from bringing up its charges of trade secrets theft against California Computer Products, Inc. (Calcomp) during that firm's antitrust trial against IBM.

Judge Ray McNichols granted a Calcomp motion to forbid mention of IBM's charges of trade secrets theft and thus prohibited IBM counsel from cross-examining Calcomp Chairman Lester Kilpatrick on matters relating to the issue.

Although McNichols had previously severed IBM's charges against Calcomp regarding trade secret theft for hearing later, Calcomp apparently thought it expedient to have McNichols rule on whether such matters could be brought up in questioning Kilpatrick.

The Calcomp chairman will take the witness stand today after a week's recess for his third day of cross-examination. He previously had testified on the origins of Calcomp and Century Data Systems, the disk manufacturer which Calcomp acquired.

Origin Not Germane

Calcomp attorney Max Blecher told McNichols the origin of Calcomp's products was not germane to the antitrust issues.

The important point for the judge, he said, was that the origin of the products named in the trade secrets theft suit did not diminish Calcomp's damage claims since Calcomp was not claiming damages from IBM's introduction of its 3340, 3344 or 3350 disk products.

It is those disk products that IBM has charged Calcomp with copying in the now separated suit.

Furthermore, there was no suggestion that any action by IBM was predicated on the fact that Calcomp or any other plug-compatible manufacturers (PCM) were engaged in organized or disorganized efforts to copy IBM gear, Blecher said.

Blecher warned McNichols of the dangers of admitting such evidence in this case. It would open a "Pandora's box" and Calcomp won't tolerate charges that its products were "stolen" from IBM, he said.

"You're going to get yourself into a quagmire" regarding instructions to the jury, "so then you've tried the case you [attempted] to sever," he told McNichols.

Jack Brown, representing IBM, told McNichols that Blecher's remarks to the jury on opening day made it difficult to ignore the issue of trade secrets theft.

Blecher's remark that Calcomp would view as an outrage evidence regarding trade secrets theft constituted an open challenge IBM doesn't intend to ignore, Brown stated.

Brown was upset about this remark because his portion of IBM's opening statement dealt with details of IBM's charges that Calcomp copied its products. Calcomp had done so since Century Data Systems' first ventures into disk products, he said, by acquiring information from IBM drafts and a former IBM employee. Calcomp later acquired Century.

If Brown were to be forbidden to present evidence, it would be hard to believe jurors could "conclude anything but that Calcomp was right" and his statement was a "total outrage," Brown said.

"Surely we're entitled" to give IBM's version of how Century Data Systems, which later merged with Calcomp, got started, he said.

IBM should be permitted to answer Calcomp's allegations that it didn't introduce voice coil technology in the 2319 because it was "sitting on" such new developments until it was forced by competition to improve its products, Brown said.

"We should not deny the jury facts that we know are at the heart of the controversy," he continued.

David Boies, leading the IBM defense team, pointed out it will be hard to cross-examine without raising problems.

McNichols said he was "sorry" he permitted mention of the controversy during attorneys' opening statements.

McNichols agreed to Boies' request to preview some questions Boies planned to ask Kilpatrick.

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IBM Admits Hiring Shadow Jury at West Coast Trial

(Continued from Page 1)

this research which involved the employment of six people by a university professor in order to simulate a jury in the trial of the Calcomp case," the spokesman said.

Donald E.Vinson, the professor conducting the research project employing the six members of the shadow jury, said he hopes to publish the results of the project.

Vinson, an associate professor of marketing at the University of Southern California, said he was retained by Cravath Swaine & Moore, the law firm representing IBM in the case, but the law firm did not direct his study or determine the methodology employed.

The project's budget was "under $25,000," he added.

Cravath was permitted to review Vinson's notes acquired from daily debriefings of the six people on their attitudes, interests and opinions on courtroom proceedings and their perceptions of people and evidence, Vinson said.

However, Vinson himself has not yet analyzed the data, he added.

IBM counsel was primarily interested in knowing the reactions of the six persons on a daily basis. "Obviously, it was essential to the success of the study that the simulated jurors did not know that IBM was funding this research since this could affect their reactions," the spokesman said. "Accordingly, publicity had to be avoided."

When asked whether he was instructed to assemble a group closely matching the economic and educational backgrounds of the Calcomp jury, Vinson said he received no such instructions.

He did, however, use the public information about the Calcomp jury along with other criteria used in standard research procedures in selecting the six research assistants for the project in participant-observer research, he said.

He looked for characteristics that would enable him to study how decisions are made in a very complex decision-making environment and the trial's implications to the way American business is conducted.

"It's a tricky legal issue, very complex, and there's a great deal of money involved," he said. He is also interested in group dynamics from a sociological perspective.

Vinson emphasized he never at any time interacted with anyone from IBM.

Univac to Court Smaller Users

(Continued from Page 1)

minimum of 32K bytes to 64K bytes in 16K-byte increments.

High-speed peripherals such as disk and tape are attached to the system via a direct memory access controller. A shared direct memory access controller interfaces low- and medium-speed devices to the BC/7.

A micro-coded communications line adapter allows one BC/7 configuration to communicate with another through a standard interface, the spokesman added.

The system's console is housed in a desk and contains a 5-in. CRT screen that displays messages about the system's status in English.

Local, Remote Workstations

Users interact with the system through a workstation that includes a 12-in. CRT, keyboard and numeric pad, microprocessor and memory.

Up to four workstations can be placed within 1,000 feet of the CPU, and the units also can be used remotely.

A 300 line/min nonimpact page printer can be tied into each workstation for hardcopy printout of the display.

Two line printers — one operating at 125 line/min and the second at 250 line/min — were introduced with the BC/7. Also announced was a 200 char./sec printer that is available in a bidirectional printing version.

Mass storage can be floppy disk, cartridge or tape. Up to 40M bytes of floppy disk storage can be added to the system.

The cartridge drives used with the unit are IBM 5444-compatible, Univac said. One or two Uniservo 10 tape units can also be used.

Variety of Software

A variety of software was announced for the BC/7. Although the system is programmable in RPG-II, another language called Escort has been developed which allows the user "to specify data management requirements by tutorial conversation method," Univac said.

Inquiry, reporting and file maintenance programs can be directly programmed or written in tutorial style, the spokesman added.

The System Control Language appears as English commands and specifies the programs and files to be used. A File Management System and a Data Entry System as well as a variety of utilities are also available, the firm stated.

The application modules available for the system are the Accounting Management System with general ledger, accounts payable, accounts receivable and payroll; the Wholesale Applications Management System for ordering, billing and inventory needs; and the Manufacturing Applications Management System for bill of material, inventory control and material requirements planning.

Univac also introduced its Pixie adaptive software technique which allows the user to modify the applications packages to meet his needs, the spokesman said.

A basic BC/7 system with 48K bytes of memory, six floppy disk drives with 3M bytes of storage, matrix printer and workstation costs $43,725 or $933/mo including maintenance, applications programming, installation support and operator training.

Call for New Trial Stands As Catamore Appeal Denied

BOSTON — The U.S. Court of Appeals here has let stand its order calling for a new trial in Catamore, Inc.'s breach-of-contract suit against IBM [CW, Oct. 25].

The court last week denied a Catamore motion for a rehearing of its earlier decision overturning a jury verdict that awarded Catamore $11.4 million in damages.

Catamore intends to appeal the appeals court decision to the Supreme Court, according to attorney Thomas K. Christo, and in the meantime has asked for a stay of the court's order denying the petition for rehearing.

Our Newest Pets and

A few months ago we predicted that our CAROUSEL printer with its forms-handling capabilities was going to be an instant success. We were right.

We told you then that there was more to come. That we were starting to build "the most comprehensive line of terminals ever offered by a single manufacturer."

We didn't want to keep you waiting. This week we're unveiling the first two new products in our CRT line: the FOX-1100, a low-cost, not-so-dumb CRT; and the OWL-1200, an editing terminal that's remarkably easy to program. A different breed of terminal. With a different kind of service.

Other manufacturers offer "worldwide service." We go a lot further. At PERKIN-ELMER we offer No Hassle service. All our terminals come equipped with our No Hassle, 800 toll-free service phone number. One call does it. We give you service where you need it, when you need it. We're there. Not just "worldwide," but wherever you are.

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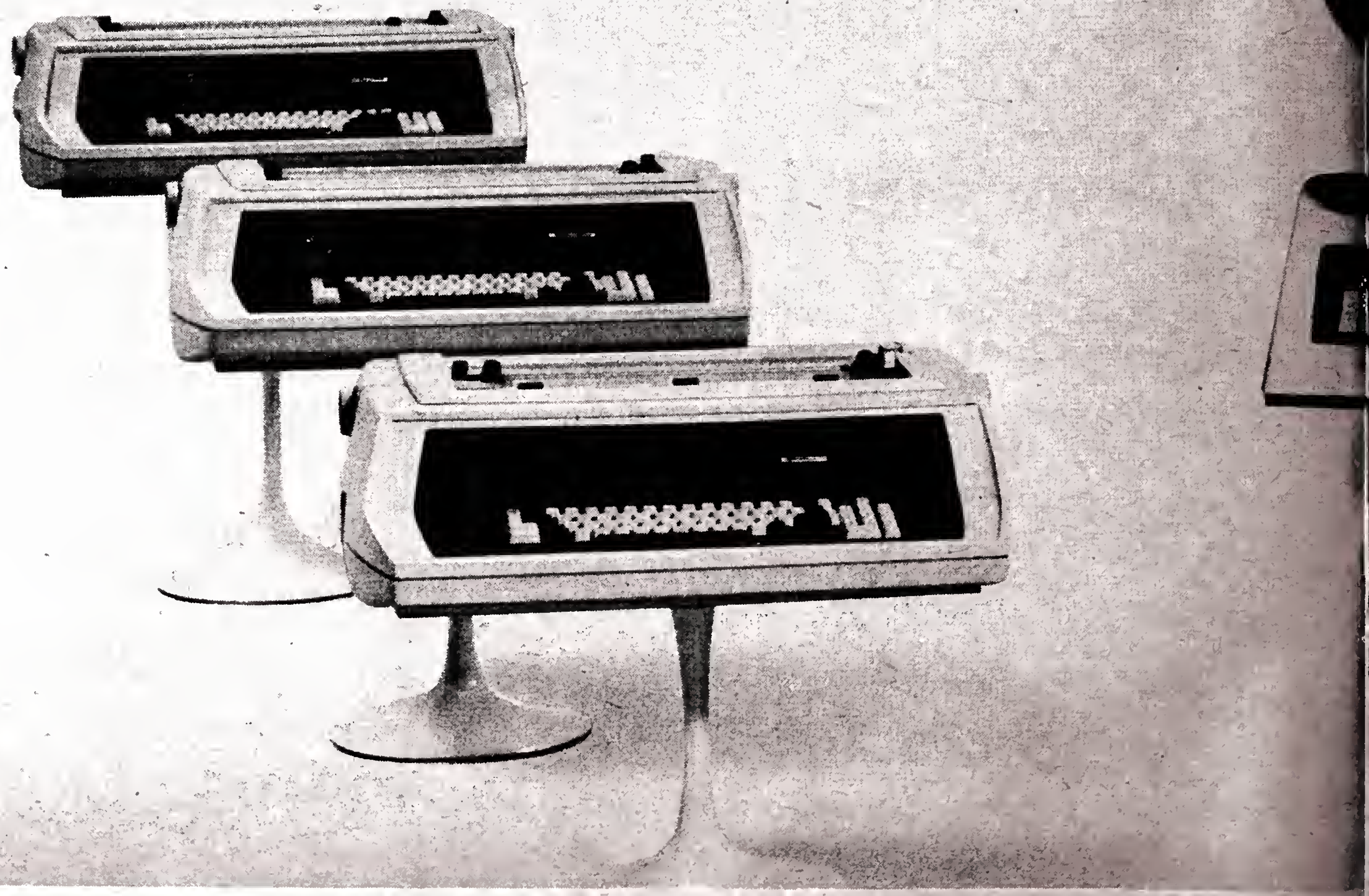

IBM Guard Changes

ARMONK, N.Y. — Three Democrats left the IBM board here recently to join the new Administration in Washington, but three Republicans leaving federal service replaced them.

The directors who left to serve in the Carter Cabinet are Cyrus R. Vance, Secretary of State; Harold Brown, Secretary of Defense; and Patricia Roberts Harris, Secretary of Housing and Urban Development.

Two members of the new guard are actually reenlistees. T. Vincent Learson, who resigned from IBM's board in December 1975 to become an ambassador-at-large and Presidential representative to the Law of the Sea Conference, is returning, as is William W. Scranton, who left the board in March to become the UN ambassador.

William T. Coleman, former Secretary of Transportation, rounds off the trio of Ford people joining the IBM board.

IBM Settlement 'Not in the Wind': U.S.

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. — A settlement of the government's eight-year-old antitrust case against IBM is "certainly not in the wind," a Justice Department official said here last week.

Reacting to earlier reports about a meeting between Nicholas deB. Katzenbach, IBM vice-president and general counsel, and Donald Baker, chief of the Justice Department's Antitrust Division [CW, Jan. 17], the official said Katzenbach presented IBM's view of the case during the meeting.

In outlining that position, it was "fairly clear" what the firm would like to see in the way of a settlement, one participant noted, but a specific settlement plan was never suggested, he added.

Also present at the meeting held three weeks ago were Lloyd Cutler of Wilmer, Cutler and Pickering, which represents IBM here; William E. Swope, director of operations for the Antitrust Division; and Raymond Carlson, who leads the government team trying the case.

Swope said last week it is not unusual for defendants in such cases to try to discuss the progress of the cases with the head of the Antitrust Division, but he indicated such interviews were rarely granted.

Because the IBM case is such a major action, however, an interview was granted in this case, he said.

HIS Extends Distributed Options

(Continued from Page 1)

and control of the processor's cache memory. Main memory is MOS and ranges from 512K words to 2M words using up to four processors.

With interleaving, dual memory units and dual controls, main memory subsystems can be accessed at a burst rate of 20M- to 30M byte/sec, HIS said. Error detection and correction techniques take care of single-bit errors.

Cache memory and an optional disk buffer are also available. The disk cache buffer stores and regulates large groupings of related data for subsequent access, reducing the number of physical disk accesses necessary, he explained.

The System Control Unit is a dual-processor microprogrammed unit that controls both the CPU and peripherals' access to main memory and communications between central system elements.

An I/O multiplexer subsystem with up to four high-speed multiplexers controlling a maximum of 16 high-speed peripheral processors and two low-speed multiplexers accommodating up to 24 unit record devices is also part of the system, HIS said.

A system console which interfaces to the 66/85 through low-speed channels can be configured with up to seven devices including printers, CRTs and teleprinters.

The 66/85 features Current Mode Logic devices said to be eight to 15 times denser than conventional bipolar logic devices. Coolant for the system is pumped through a heat exchanger connected to the back of each micropackage, the spokesman explained.

Level 64 Extended

Along with the 66/85, HIS announced three additional members of the 64 line.

With memory from 64K to 384K bytes, the 64/30 can support three peripheral processors. The mass storage processor controls up to eight 100M-byte disks, the tape processor controls up to eight tape units and a unit record processor accommodates up to five unit record devices, according to the vendor.

A communications controller supports up to 14 lines with 16 terminals per line. Three I/O channels transfer data at 1,250 byte/sec maximum, the firm said.

With memory from 96K to 512K bytes, the 64/50 supports twice the mass storage and magnetic tape capacity of the 64/30, HIS said. In addition, the system can support two unit record processors and 14 additional communications lines. Three standard and six optional I/O channels are available.

With the 64/60, users receive memory expandable from 192K to 768K bytes and up to three mass storage processors accommodating up to 24 100M-byte disks. Up to 16 tape units can also be used.

Two unit record processors can be configured with the system with a maximum of 42 communications lines, HIS said.

A typical dual-processor 66/85 with 1M words of memory; a console; two card readers; card punch; two high-speed line printers; dual-control, dual-channel magnetic tape subsystem with 12 1,600 bit/in. units; 3.2M bytes of mass storage; and two Datanet 6678 front-end processors costs $128,082/mo on a six-year rental basis or $6,207,623. The monthly maintenance costs $15,764.

A 64/60 with 384K bytes of memory, 600M bytes of disk, six 200K-byte magnetic tape units, a 1,600 line/min printer, 1,050 card/min reader and console costs $18,478/mo on a five-year contract or $848,495.

A typical 256K-byte 64/50 with 500M bytes of disk, six magnetic tapes, 1,200 line/min printer, 1,050 card/min reader and a console costs $14,923/mo on a five-year contract or $675,475.

The 64/30 costs $9,765/mo or $448,935 for 128K bytes of memory, 300M bytes of disk, four 120K-byte magnetic tape units, 1,200 line/min belt printer, 600 card/min reader and console.

The 64/60 will be available in 1978 while the 64/30 and 64/50 will be available in mid-1977.

ow We Care for Them

DP Crooks Leave No Evidence of Crime, Users Warned

By Toni Wiseman
Of the CW Staff

NEW YORK — When something is stolen from a store, management either learns about the loss immediately or after the next physical inventory. Computer fraud is not so easy to detect, according to Anthony M. Joseph, director of Haskins & Sells.

"No shattered windows, forced locks, price tickets concealed behind fitting room mirrors or year-end shrinkage figures bear testimony to the activities of the computer fraud artist," he told a recent conference of retailers here.

If computer frauds are discovered at all, it is usually as a result of "pure happenstance," he said, adding that the greatest threat is posed by the trusted insider.

Getting the management of a store to recognize the danger of computer fraud is an important first step toward its prevention, but this is not always as easy as it sounds because everyone assumes computer fraud is something that happens only to the "other guy," he pointed out.

Three Necessary Controls

According to Joseph three types of controls are needed in a computer environment: physical security measures aimed at controlling access to the computer room; internal computer security mechanisms which are incorporated into the hardware, software and data communications circuits of the system; and operational and procedural security.

The final group of controls, known as application controls, are administrative rather than physical and are concerned with such matters as preemployment checks, the separation of clerical duties or the constraints that should be placed on DP personnel to prevent the execution of unauthorized programs, he explained.

"Security measures that fall into the first two classifications and that relate to physical and internal computer hardware controls are general in nature in the sense that they are not tied to specific applications. This makes them appropriate regardless of which systems are computerized.

Security Development

"Security measures, on the other hand, are less generalized and have to be developed in large measure at the application level," he said.

While a sound physical controls program is not to be scoffed at, resourceful computer fraud artists have been able to siphon off hundreds of thousands of dollars from their employers without ever having set foot in their companies' computer rooms, Joseph noted.

He therefore proposed that an effective security program incorporate application controls that will deter — if not completely prevent — employees or others from stealing via the computer and also disclose any irregularities as they occur.

Anticipating Possible Fraud

"The exposure to possible fraud can be reduced drastically without major expense by anticipating the possible ways in which it can be committed and devising systems controls to catch any such attempt," he said in quoting James Martin.

Targets in the retail area might include accounts payable, merchandise control, sales recording, sales audit and credit and accounts receivable, he said.

Appropriate controls for potential targets in a batch environment are quite similar to those taken in the past to protect the integrity of manual systems, he said. These include separation of duties, third-party reviews, numerical sequence checks, balancing of predetermined control amounts, restricting access to documents and direct confirmations.

But, because a computer is involved; these traditional controls must be augmented by measures that ensure only authentic programs are executed and report any unusual transactions encountered during the course of each day's processing, he cautioned.

On-line systems, however, are not susceptible to control by the same methods as batch systems, he indicated.

"In batch processing, transactions are batched, keypunched, verified, balanced and validated before any files are updated. However, in the typical on-line, real-time system, many terminals are linked to a central computer by cable or telephone lines and files are updated as transactions occur," he said.

Compounded Problem

"The problem is compounded further when the computer is time-shared and available to outside users via dial-up voice-grade telephone lines," he added.

"With these systems, security measures must be broadened to ensure that users and terminals are properly identified; that access to programs and files is adequately controlled; and that comprehensive audit trails are provided.

"In the case of communications-based systems whose security may be compromised by electronic eavesdroppers, a company may have to resort to cryptography to render its data unintelligible during transmission," Joseph stated.

'Adapt or Die' Theme Of New England Meet

NEW HAVEN, Conn. — "Adapt or Die" — that's the theme for the New England Data Processing Management Association's (DPMA) first Mini/Micro Conference scheduled for May 19-20 here.

The dinosaur was chosen as the conference symbol by its sponsor, DPMA's Southern Connecticut Chapter, as a reminder of what happens to those who don't adapt, according to conference chairman Frederick Kells-Murphy.

The conference will include both technical sessions and exhibits and is aimed at the systems analyst and programmer as well as the DP manager in the New England area.

The conference will feature a "Mini vs. Maxi" debate between John Hughes, vice-president of City Bank of New York, who will represent the mini view, and Robert Weisman, president of National CSS, Inc., who will represent the mainframe view.

Univac's Dr. Carl Hammer, DPMA Man of the Year, Patrick J. McGovern, board chairman and publisher of *Computerworld*, and Robert J. Marrigan, DPMA's international president, have already been signed on as featured speakers for the event.

Registration forms and additional information are available from Necon 77, DPMA, P.O. Box 3024, Bridgeport, Conn. 06605.

A $971* Pet That's Du

A low-cost display doesn't have to be dumb. Not if it's smart like our new FOX-1100. Our FOX gives you a full 24 line by 80 character display, a unique 9 by 12 character matrix for super legible characters, full cursor addressing, complete tabbing capability, and Typamatic repeat on all keys. Plus a lot more. All for just $971 in quantities of 25.

And a smart terminal at the right price isn't all you get with an 1100. Our FOX is designed to interface with people. Human engineering features like a hooded eye-level display and an easy-to-work-with, powerful keyboard make it an operator's pet.

Check the comparison chart to see the reasons why the FOX-1100 is the only low-cost CRT with smarts.

CUSTOMER NEED	FEATURES	PERKIN-ELMER	ADDS	LEAR SIEGLER	DEC
		FOX-1100	520	ADM-3	VT-52
Easy-to-Read Display	9 X 12 Matrix for highly legible characters	Yes	No	No	No
	Black on white or white on black display	Yes	No	No	No
	Display at eye level	Yes	No	No	No
	Display set deep in hood to reduce glare	Yes	No	No	Yes
	Full 24 X 80 display	Yes	Yes	Option	Yes
	Full 96 character set, upper and lower case	Yes	No	Option	Yes
	Easy-to-find block cursor	Yes	No	Option	No
Ability to Enter Data Anywhere on Screen	Complete cursor addressing and control	Yes	Yes	Option	Yes
High Operator Throughput	Tab stops that can be set to any column	Yes	No	No	No
	Tab key	Yes	No	No	Yes
Low Operator Fatigue	Backtab key	Yes	No	No	No
	Shiftlock key	Yes	No	No	No
	Typamatic repeat on all keys	Yes	No	No	No
	Separate print key	Yes	Yes	No	No
	Backspace key	Yes	Yes	No	Yes
Convenient Switching Local/On Line	Local-remote mode key	Yes	Yes	No	No
Simplified Interfacing to Printer	Fully buffered port to make printer speed independent of CRT speed	Yes	No	No	No
Easily Accessible Mode Controls	New line enable key	Yes	No	No	No
	Autoline feed key	Yes	Yes	No	No
	Scroll enable key	Yes	Yes	No	Yes
High Speed Numeric Input	Integral numeric pad	Option	No	Option	Yes
Simplified Program Debugging	Transparent mode and displayable control characters	Yes	No	No	No
Cost Effectiveness	OEM price in quantities of 25 for basic unit with 24 X 80 display	$971	$1195	$1080	$1476

*In quantities of 25.

1974 Law Seen Misconstrued

Security Measures Not Means to Privacy Ends: OTP

By Nancy French
Of the CW Staff

WASHINGTON, D.C.— Too many federal agencies are using the Privacy Act of 1974 to justify security measures Congress never actually intended to protect data communication systems, according to a document written by the Office of Telecommunications Policy.

Some of these measures not only "promote a false sense of security," they "pave the way to even greater potential abuses of individual privacy," the OTP circular warned.

Equally important, the cost of such systems is not justified by the language of the law.

The White House OTP is circulating for official comment before adoption a set of guidelines that spells out what data protection measures the Privacy Act of 1974 requires.

A copy of the circular, obtained by *Computerworld*, pointed out that in their concern for privacy through security, agencies may be losing sight of some other important federal policies, such as placing maximum reliance on the private sector for services rather than setting up in-house systems, maintaining proper separation between federal, state and local responsibilities, minimizing duplication and maximizing competition.

Specific agency activities that stem, at least in part, from an apparent misinterpretation of the Privacy Act include an increased emphasis on special, nonshared data communications systems and an increased emphasis on special communications security measures such as encryption, the circular said.

While such activities can be justified under certain circumstances, they are not normally the proper response to the intent of the Privacy Act of 1974, it added.

Controlling Disclosures

Under the Privacy Act, agencies that maintain systems of personal records are responsible for controlling disclosure —that is, transferring records or granting access to them.

While a communications system is a means of providing user access to the systems and also transferring the information, the decision of whether to contract for operating a communications system or performing the operation "in-house" was not intended to be altered by the Privacy Act.

The circular reminded agencies that under existing policy, they are supposed to limit their role in telecommunications to that of a user rather than a provider of service. The Privacy Act does not change this.

The circular also pointed out that while communications security measures may be an effective way to deny "outsiders" or unauthorized users access to confidential records systems, they are of little value in preventing misuse of personal information by authorized users.

Directed at Authorized Users

It is the authorized users of information toward whom the Privacy Act was actually directed, the circular said.

The writers of the document indicated that the cost of security measures of this type is significantly more than just the obvious cost of the devices that might be involved.

Costs associated with cryptographic key management systems, personnel training programs, special physical security requirements as well as other supporting functions could easily exceed the more obvious costs of the communications security devices themselves.

The growing tendency for agencies to specify a dedicated network in support of their own systems of records further indicates that the agencies may be protecting themselves from a nonexistent threat.

Control Transfer Recommended

The OTP recommended that agencies turn over operational control of communications networks to private sector organizations while retaining formal responsibility for access and record transfer.

Exceptions to the rule must be justified by some statute other than the Privacy Act.

Any interconnection of telecommunications networks or services supporting systems of records would be considered a change in access and would require notifying the Office of Management and Budget and Congress in advance, the circular said.

A telecommunications network or service to support a system of personal records is not justification per se for a dedicated communications network.

Before communications security devices can be justified for protecting information, personal or otherwise, that is not of a national security nature, agencies must determine that misuse by unauthorized persons is anticipated.

In this case, an agency should analyze the risks and possible countermeasures to determine which method is the most cost effective.

MSU Student Team Wins ACM Contest

BOWLING GREEN, Ohio — Students from Michigan State University (MSU) won, for the third time in a row, the East-Central regional computer programming competition sponsored here last month by the Association for Computing Machinery (ACM).

The participating teams had four hours to solve four programming problems which dealt with getting through a maze, identifying a specific series of fractions and handling bank accounts.

The fourth problem, which no team had time to complete, involved producing a program of how long division is done manually.

The MSU team scored highest among 10 universities and colleges in the region.

The team was coached by Richard J. Reid, professor of computer sciences. Team members included James Picard, Detroit; Dale Nickels, Des Plaines, Ill.; Mike Slattery, Chicago; Robin Beer, Pittsburgh; and David Knight, Lansing, Mich.

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Baltimore Dealers Using Mini

Lemon or Peach of a Car? System Lets Buyer Know

By Edith Holmes
Of the CW Staff

BALTIMORE — Do you trust your auto mechanic or local used car salesman? How do you feel about computers? Would you trust the two together?

About 10 car dealers and repair shops in this area are employing diagnostic computing techniques that they say should allay the fears of the wariest customer.

Designed to keep people from getting stuck with new or used "lemons" and from paying for unnecessary repairs, the system compares the engine specifications of a car with those of the auto when it came out of the factory.

Called "Autosense," the system will also tell the mechanic and the customer why a part is bad and how to repair it.

Autosense consists of a minicomputer with a 4K-word memory, tape cassettes containing all vehicle specifications and programs, a printer to generate hard-copy reports on the car tested and a hand-held keyboard/display which lets the mechanic communicate with the system, according to a spokesman for the device's manufacturer, Hamilton Test Systems in Windsor Locks, Conn.

Five sensors, several electrical clips and an exhaust emission probe connect the computer system to the car engine and exhaust pipe, he explained. These sensors measure such engine conditions and parts as ignition, timing, battery, coil and regulator and can be hooked up to the car in less than three minutes.

A complete Autosense checkup includes 30 test sequences made up of one to 59 individual tests each and takes about 30 minutes to run, the spokesman said.

Normally, analysis of a particular vehicle problem takes two to 10 minutes depending on the tests to be performed.

Once the mechanic has repaired the problem, a second test is usually run by the repair shops here and a second printout is generated to show the customer the once-faulty part now meets factory specifications.

The initial and the final printouts identify the car being tested, the type of tests conducted, the conditions tested, their acceptable high and low operating limits, the actual results of the vehicle's performance, whether it passed the limit standards and repair instruction codes for the mechanic's use.

The hard-copy report becomes an instruction sheet for the mechanic, a basis for an estimate of the cost of the work to be done and a record of the repairs made for the customer and the service manager.

Prices for the full test range from $9.95 to $14.95 in the Baltimore area, according to the dealers who own Autosense. The computer system itself cost them $14,500.

Programs provided on tape permit Autosense to test any gasoline-fueled automobile, truck or bus, the Hamilton spokesman said. The system contains sufficient memory to allow it to be adapted to diagnose air conditioning, high-energy ignition and other vehicle systems as they are introduced, he added.

The tapes are updated annually as new car models are introduced. In addition to covering all American Motors, Chrysler, Ford and General Motors cars made in the last 10 years, the system can test imported cars and light trucks of 24 major makes ranging from Audi to Volvo.

Hamilton Test Systems sells Autosense in the U.S. through 40 dealerships.

Improved Credibility

The owners of the system in this area feel they have improved their credibility in the eyes of those whose cars they repair and to whom they sell new and used autos.

"This thing ends the era of the ripoff," according to Fred C. Roop Jr., owner of Colony 7 Shell near Laurel. "There's no way I can sell someone a set of plugs unless the machine fails the ones already in th car."

Roop said his full $9.95 checkup has attracted customers seeking "cheap insurance" on a used car they are considering buying.

"The accuracy of the thing is just unbelievable," Roop stated. "There's no mechanic who can hear two degrees in the timing of a car engine like this computer."

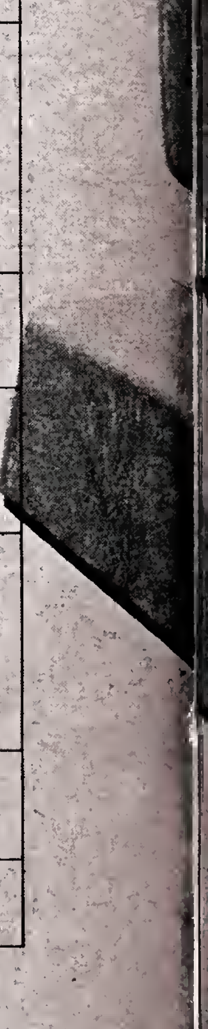
Walt Phillips, service and parts director at Jarman Pontiac, and Bruce C. Johnson, general manager of Suburban Chevrolet, agree with Roop.

Phillips said the system "just tells the customer the facts." Johnson uses Autosense to preservice all used and new cars to assure his customers they are buying "a perfectly running automobile."

Hamilton adapted the digital computer technology it developed for in-flight monitoring and diagnostic systems for wide-body jetliners to make Autosense.

Mechanics communicate with the system through this hand-held device.

Autosense at Work



An Editing Pet Tha

The perfect editing terminal for transaction processing must be more than a little bit smart. It has to be wise like our OWL-1200. With features that assure high accuracy source data entry, fast data editing, simplified host computer programming, and reduced host computer loading.

Our OWL gives you all the human engineering features you get with our FOX-1100, plus a lot more. And the price is right. Just $1496 in quantities of 25.

Check the comparison chart of editing terminals to see all the reasons why the OWL-1200 is simply "incomparable."

		PERKIN-ELMER	HAZELTINE	LEAR SIEGLER		ADDS
USER REQUIREMENT	FEATURES	OWL-1200	MOD. 1 EDITING	ADM-1A	ADM-2	980
High Operator Data Entry Accuracy	Protected fields	Yes	Yes	Yes	Yes	Yes
	Low-intensity fields	Yes	Yes	Partial	Partial	Partial
	Numeric only fields	Yes	Yes	No	No	No
	Inverse video fields	Yes	Yes	No	No	No
	Blink fields	Yes	Yes	No	Yes	Yes
	Line drawing capability	Yes	No	No	No	Yes
Simple, Fast Editing of Data	Insert/delete character	Yes	Yes	Partial¹	Yes	Yes
	Insert/delete line	Yes	Yes	Partial¹	Yes	Yes
Minimized Loading on Host Computer	Host programmable send keys: send all data, send only unprotected data, send only data modified by operator, send only a "request to send" header.	Yes	No	No	No	No
Simplified Programming	Ability of host CPU to read device status	Yes	No	No	No	No
	Ability of host CPU to read device mode key settings and communication option straps	Yes	No	No	No	No
	Program override on mode key settings	Yes	No	No	Yes	No
Simplified Program Debugging	Transparent mode permits all characters to be displayed	Yes	No	No	No	No
Cost Effectiveness	OEM price in quantities of 25*	$1496	$1670	$1795	$2395	$1995

*When unit includes editing capabilities, 24 x 80 display, numeric pad, and upper/lower case characters.

¹No Key. Requires Two Key Code.

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Mini-Based System Helping the Tense Learn to Relax

By Esther Surden
Of the CW Staff

MONTROSE, N.Y. — Every DP manager knows the tension headache that comes when the system's down and the service person is three hours late.

But, finally, DP and science may have come up with a way to help people get rid of tension.

A minicomputer-based system which is now in use at the FDR Veterans Administration Health Care Facility here is training subjects to reach a deeper state of relaxation than is normally possible, according to Dr. Alan T. Pope, project designer.

"We are working with electromyography, which is simply the feedback to the subject of the electrical activity that comes out of the muscles when they are tensing," Pope said.

The minicomputer is based in a process control application. Electrodes such as those employed in the common electrocardiogram are attached to the forehead of the subject and connected to a normal type of biofeedback unit.

Tells Subject of Progress

The biofeedback unit uses a tone or a meter to tell the subject how well he is progressing.

"What we've done is attach the computer to this kind of loop so that as the person is progressing the computer sees how well he is progressing and changes the amplification.

"It's much like adding weights to a barbell as you get stronger at weightlifting," Pope explained.

In other words, the system adapts itself to the patient's level at any given time, he said.

Although microprocessor chips may be built into biofeedback instruments soon, all the micros can perform now is data acquisition, not process control, he said.

The minicomputer system at FDR includes a Data General's Nova 2/10 with 24K words of core, two cassette tape drives, a Teletype console, analog and digital interfaces and analog processing amplifiers for the signals. It cost about $17,000.

Other minis could probably perform the operation just as well, Pope noted. He looked at the Digital Equipment Corp. PDP series but chose the Nova on the basis of a cooperative salesperson, he said.

Decision to Hike Airline Fares Aided by DP-Crunched Numbers

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — When the Civil Aeronautics Board (CAB) decided to allow nine airlines to increase their domestic fares by 2% recently, a computer system was used to generate the figures the board members needed to reach that ruling.

For over two years, the regulatory agency here has employed its mainframe to calculate the rate of return received by the airlines from passenger fares and cargo rates after costs have been deducted.

The CAB has set the return rate at 12% for all international U.S. air carriers and for all interstate domestic carriers.

The agency's IBM 370/155, running under OS/VS1, is programmed to calculate the rate of return the airlines are actually receiving, based on financial and traffic numbers they are required to report regularly to the Federal Government, according to Brad Hoke, chief of the DP division in CAB's Bureau of Accounting and Statistics.

Fare decisions are made by human beings; the CPU is used only to eliminate the drudgery of repetitive calculations, Hoke emphasized.

Many factors go into determining what return on investment the airlines receive from the current fares and rates they charge and how far that figure is from the 12% standard.

Among these considerations are the utilization of aircraft, traffic profiles of people and freight, the existence of any discount fares, fuel costs, landing fees, the cost of borrowing money, labor costs and the ever-present inflation rate, Rob Sulek explained.

A member of the Domestic Passenger Fares Section of the CAB, Sulek is responsible for calculating the return on investment for the airlines' continental operations.

Although increasing fuel costs are usually the principal reason for the fare increase requests by the airlines, they were not considered in the latest fare adjustment, Sulek said. The latest increases were based on changes in aircraft utilization and passenger and cargo traffic, the removal of some discount fares, the effect of past fare increases and inflation, he noted.

In addition to determining the rate of return on investment every time the airlines request an increase, the CAB updates this data quarterly, he added.

Hoke explained the backdrop of applications against which the computer is used to perform the rate of return arithmetic. This particular task falls into the category of "the recurrent production of reports from the financial and traffic data supplied by the air carriers," he said.

From these statistics and reports, the CAB's DP division creates data bases for other uses.

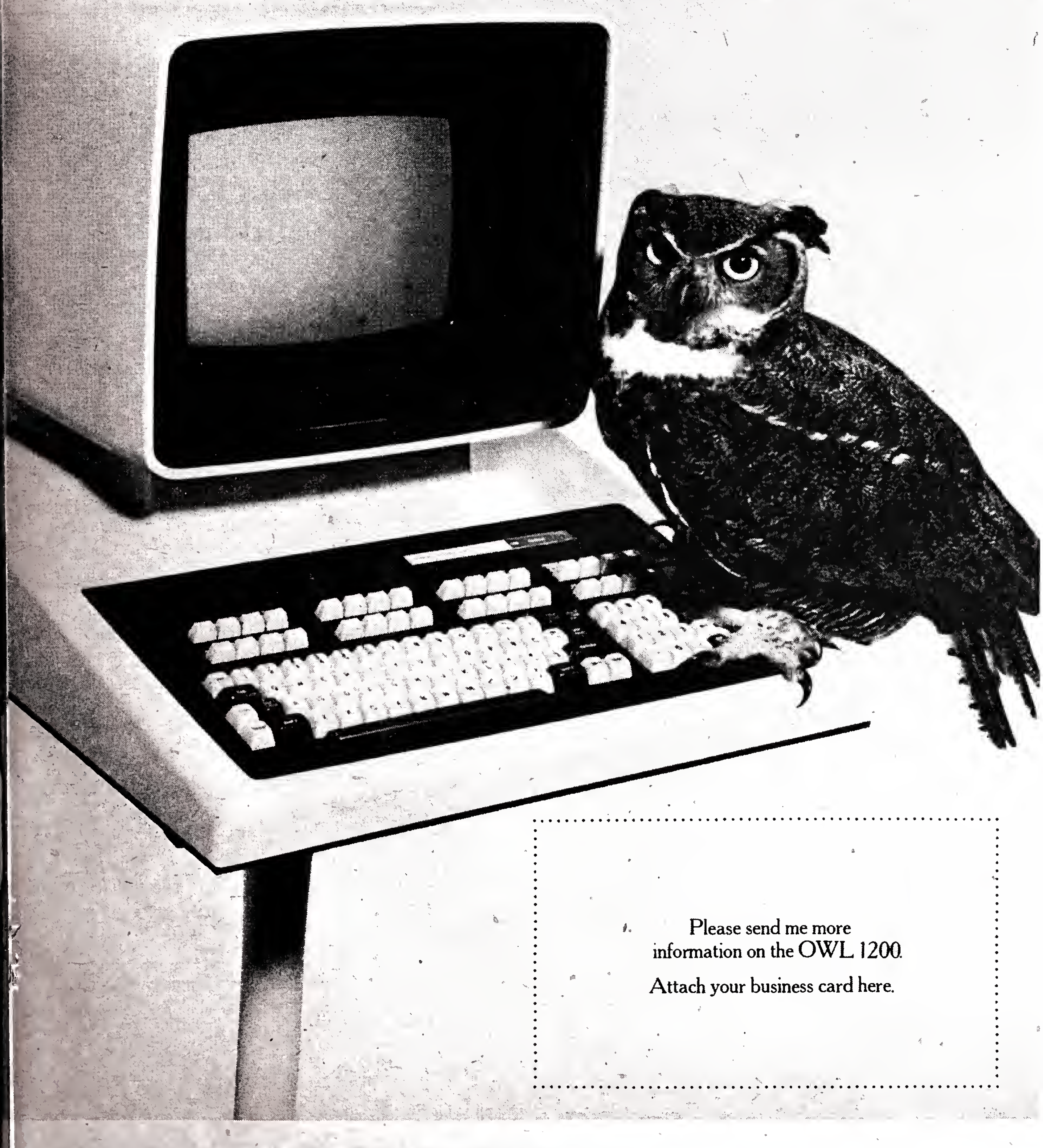
One specific set of applications relying on these data bases is the preparation of information for the board on cases pending before it, Hoke explained.

Because the fare and rate application involves the recurrent production of reports from statistics, the job is performed in a batch mode, although the board has the capability of doing it on-line, Hoke said.

"Big analytical jobs like the work done in the fare area are generally all batch," he said. Many people consider punch cards an easier and more direct approach to getting their DP work done, he added.

The CAB's computer system also is equipped to handle time-sharing, however, and has some five applications on-line. These include a type of management information system that keeps board members informed about the status of cases before them — particularly the time remaining to reach some resolution, Hoke said.

s Wise as an Owl



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University, Businesses Team Up To Train and Hire Handicapped

By Edith Holmes
Of the CW Staff

PHILADELPHIA — A dozen or more people with severe physical handicaps will soon be programming in Cobol and making a living at it here with the help of a university, local businesses and some federal tax dollars.

The University of Pennsylvania's Human Resources Center, DP managers from 19 Philadelphia institutions and the state's Bureau of Vocational Rehabilitation have teamed up to provide a nine-month training program and job offers to those who complete the course.

Participants are quadriplegics, paraplegics and victims of multiple sclerosis and muscular dystrophy, according to Judith H. Kaufman, assistant director of training in the Human Resources Department and the project's director.

Funded by a $101,000 grant from the Rehabilitation Services Administration of the U.S. Department of Health, Education and Welfare, the project consists of nine-month segments and can be renewed under its present funding for an additional two years if it is successful, Kaufman said.

Up to 16 students can be selected by the Bureau of Vocational Rehabilitation to attend the course at any one time. By the end of the sixth month of training, all these students should have accepted job offers.

Three Training Modules

The course is divided into three three-month modules, beginning with an introduction to computer programming and its fundamentals. The second module involves intensive training in Cobol. The final module demands a sharpening and refining of programming skills in addition to half-time work by the students on projects provided by the companies that hired them.

Now almost four months into the program which began Oct. 4, Kaufman said the project "is going well."

"We lost two people and may lose two more because they just didn't have the bent for programming, but the other 12 people are well "under way," she said.

Kaufman and the instructors had to adapt the program to the students enrolled and, she suggested, the result was "very individualized" training.

Among the businesses and institutions participating in the project by providing speakers and offering jobs are Atlantic Richfield Co., INA Corp., FMC Corp., Thomas Jefferson University, John Wanamaker, Philadelphia Veterans Administration Hospital, Court of Common Pleas, Bulletin Co., Reliance Insurance Co., RMC Groups, Inc., First Pennsylvania Bank, Bell of Pennsylvania and Strawbridge and Clothier.

Additional industry participants include the Philadelphia Savings Fund Society, Delaware Valley Regional Planning Commission, Pennwalt Corp., Fidelity Bank, Lutheran Church of America and IBM.

Inslaw Designs Model For Court Scheduling

WASHINGTON, D.C.— A system designed to overcome or reduce problems in the workings of the nation's judicial system by scheduling court cases has been presented in a report from the Institute for Law and Social Research (Inslaw) here.

The first in a series titled "Guide to Court Scheduling," the report was based on research funded by the National Science Foundation.

A nationwide study of court practices in cases ranging from parking violations to murder and in a comparable range of civil matters found few courts using available procedures to improve scheduling, the report said.

The computerized Model Court Scheduling System embraces a comprehensive group of techniques, including a calendaring component which was developed to deal with such problems as conflicts in scheduling court appearances of lawyers and police officers, overburdening or underusing judges and the uneven flow of cases.

In the next phase Inslaw will test the model in cooperation with three jurisdictions: the Wayne County, Mich., circuit court; the Milwaukee County, Wis., courts; and the Hennepin County, Minn., municipal court.

The tests are intended to show how the methods may be transferred for use in other jurisdictions.

Copies of the report are available from Inslaw at 1125 15th St., Washington, D.C. 20036.

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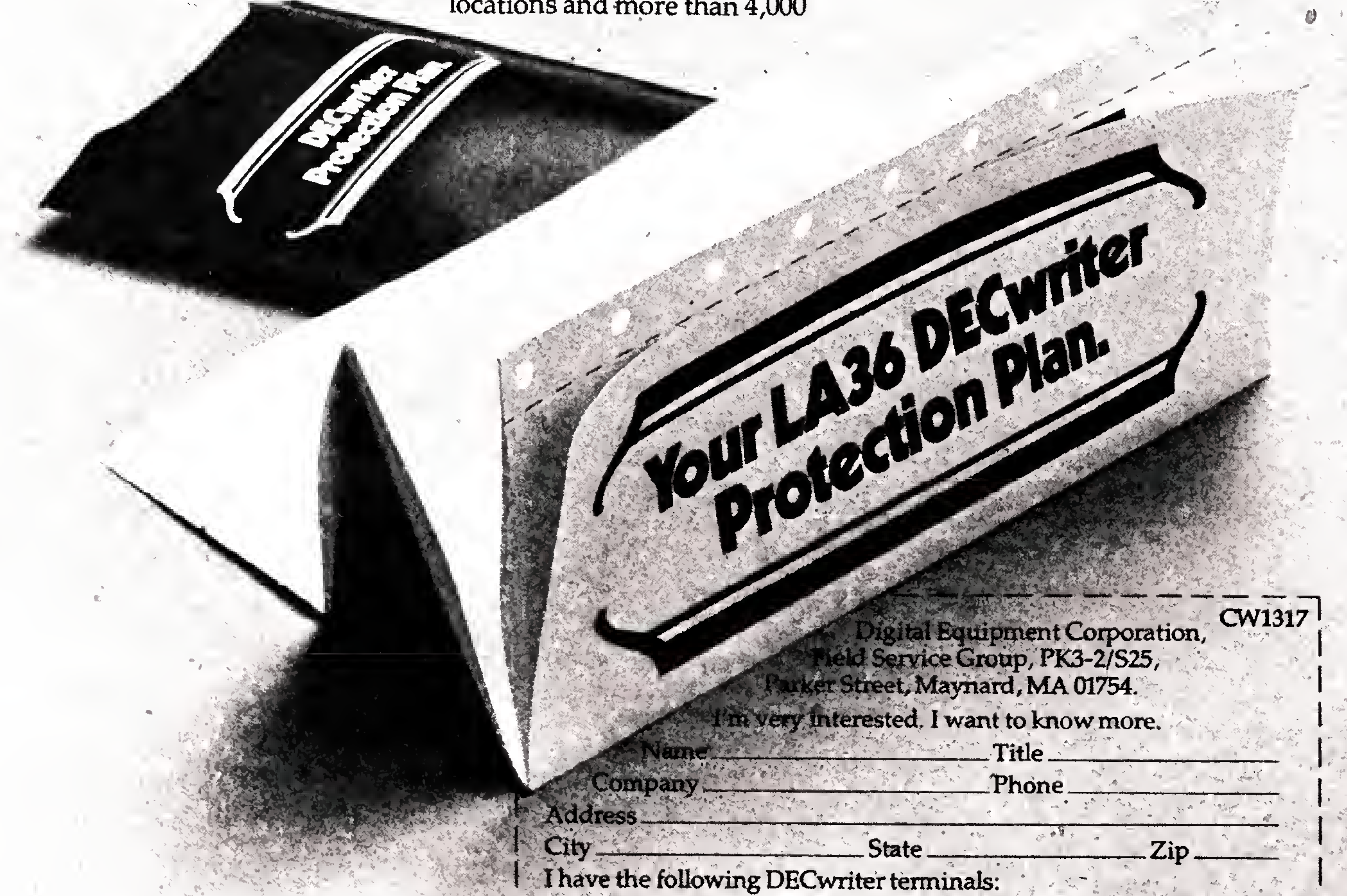
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DP Keeps 'Em 'Gasping' in Georgia

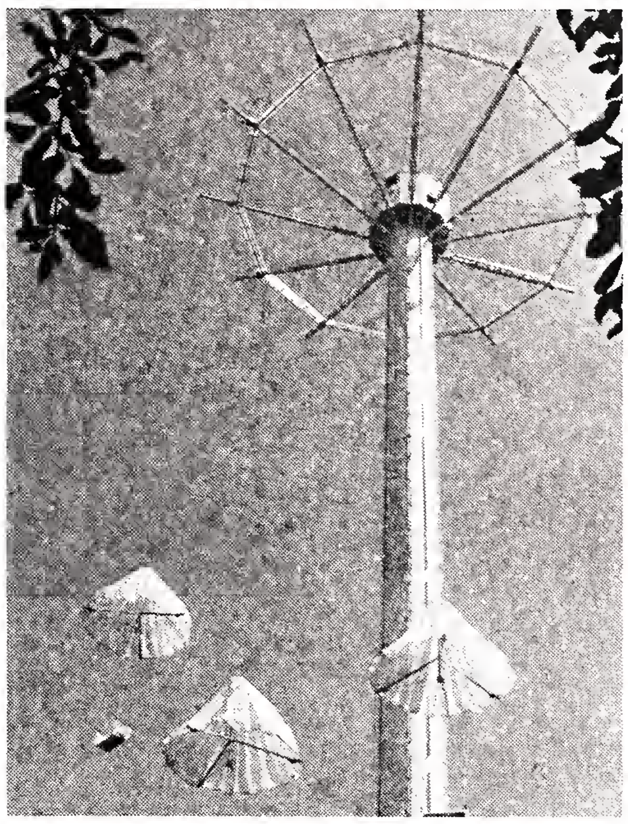
ATLANTA — At Six Flags Over Georgia, an amusement park here, "The Great Gasp" duplicates the windy discomfort of bailing out into the wild blue yonder for 20,000 riders a day.

The ride, which drops all comers at a scalp-tingling 26 ft/sec, is operated for safety by a system of proximity sensors manufactured by Honeywell's Micro-Switch Division and a programmable controller from Gertsch Electronics in Switzerland.

The no-touch solid-state controls sense the passage of the counterweights in the tower and report speed and position data in microseconds to the Gasp's programmable controller. Any deviation from programmed speed or position immediately brings the 'chute to a gentle halt. A mechanical backup system then lowers the riders to the ground.

To assure a smooth landing, the ride slows to 3 ft/sec for the last 12 feet of the trip.

Since the ride opened last April 10, no failures have occurred, according to Leon Moore, electrical supervisor of the tower.



Riders of The Great Gasp are given scalp-tingling trip down via computer control. →

Joliet System Cuts Costs to $1 For School, Career Matching

JOLIET, Ill.— The computer can be a valuable aid to students looking for colleges, careers and scholarships, but commercially available systems have one major drawback — they can cost a student as much as $49 per search.

Joliet Junior College here has beat the cost problem for area students and now offers them a computerized guidance system that provides unlimited quantities of information for a fee of $1 per student per year.

The low-cost vocational information system serves 2,000 students in 33 locations, including three prisons, in this two-county area, according to John Cripe, coordinator of the Vocational Information Program.

Students access the system by filling out a form in the classroom, their counselor's office or at home. They can either mail a form to the college or use the school's student courier service, according to Cripe.

The system is modular, enabling a student or counselor to access any one of nine information systems. This permits counselors to develop individual programs to suit their needs, he said.

For junior high students, the modules cover vocational interest testing and high school and course selection. For high school students, there are four career description modules and three college modules.

Career Information

The career information modules can provide 400-word descriptive printouts on about 400 civilian careers. In addition, there are 400 military career descriptions available in another module.

A forecast module provides Department of Labor predictions on annual job openings through 1985 for about 400 national job types.

The fourth module in the career series provides local job information. The Joliet manpower module has more than 5,000 employer reports in its file. Users can receive up to 10 pages of information on an individual job.

The system can also generate at counselors' request 25 special reports such as all jobs requiring a high school diploma. The survey can be implemented in any city, Cripe said.

Students interested in college can request a printout of national and local financial aids that match their qualifications as well as information about Joliet Junior College. The third college module provides full-page reports on about 2,500 four-year colleges prepared by the American College Testing Program.

Users may select specific colleges or choose from 163 subjects and let the computer search and print out those that match their interests.

Students Process Data

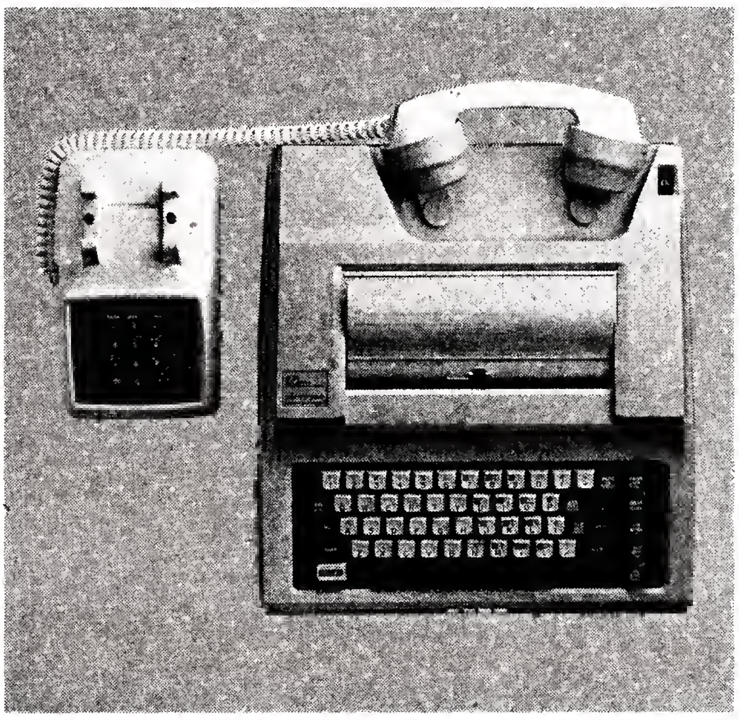
Data is processed for entry by student workers in the college's DP department and printed nightly on a 48K NCR 101. The turnaround time is a maximum of 72 hours.

Not more than two hours is devoted to data preparation and not more than one hour a day of computer time is used on the vocational program, Cripe said.

All career data files are researched and maintained by the college, and the four-year college file is purchased annually. Cost of the couriers, forms and updating the files is paid for by a consortium of secondary school users which pays a fee of $1 per student per school year for an annual total of about $17,000, he said.

Twenty-three programs written in standard Cobol run the system which is operated in a batch processing mode on any 48K computer with a disk system and standard Cobol. The Indianapolis, Ind., high school system, with 32,000 potential users, has purchased the system and is currently operating it.

The 745 Portable Data Terminal. It's like having your home office computer in the field.



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TEXAS INSTRUMENTS.

IBM Develops Fabrication Process That Could Lead to Novel Devices

YORKTOWN HEIGHTS, N.Y. — The narrowest metal lines ever fabricated have been devised by IBM scientists in a discovery which could revolutionize the electronic structure of solid-state devices and focusing lenses for x-rays, according to the firm.

The lines, 80-angstroms wide and 100-angstroms thick, have been repeatedly formed here in a process which reduces previous sizes by fivefold or more. One angstrom is 1/250,000,000 inch.

Atomic spacing in metals is usually two to four angstroms, but IBM scientists believe that lines can be formed with spacings between them as small as their width, claiming that lines 25-angstroms wide with 25-angstrom spacing will be possible.

Lines as close as this enable a man-made electronic structure to be superimposed on the inherent electronic structure of a semiconductor crystal, altering the way the material conducts electricity, according to an IBM spokesman.

It is this advance which could lead to the development of new solid-state electronic devices, he said.

New Fabrication Method

This technique can also make masks, or shielding devices, for other microfabrication techniques such as x-ray lithography and focusing lenses for x-rays.

The fabrication technique differs from earlier microfabrication techniques in which devices were formed by drawing a pattern with an electric beam in a plastic material known as "resist."

Earlier procedures had limited resolution because of backscattering of electrons from the surface on which the resist is deposited, according to the spokesman.

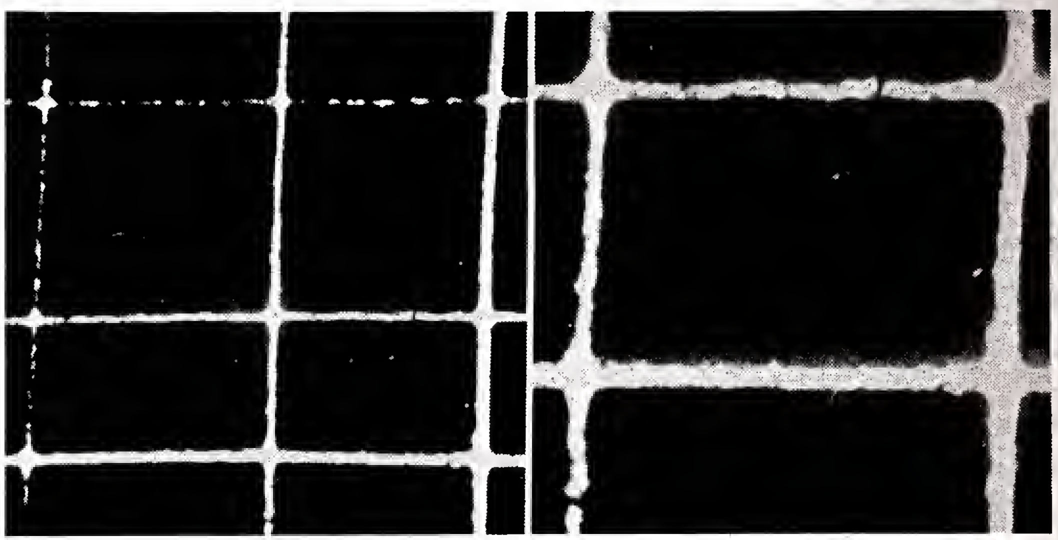
This backscattering causes a blurring of the exposure of the resist making it difficult to form lines closer together than about 1,000 angstroms, the spokesman explained.

With the new method, a thin layer of metal about 100 angstroms thick is vacuum deposited on a thin self-supporting layer of graphite, also about 100 angstroms thick.

An electron beam five angstroms in diameter rapidly builds up a layer of contamination on the metal layer which produces a polymerized material that forms a thin impervious layer.

The material is then placed in a sputter-etch apparatus, which removes the metal file in areas that are unprotected by the contamination lines.

The minimum width made to date has been limited by the grain size of the metal film, but a resolution of 25 angstroms with 25-angstrom separation seems feasible using finer-grained or amorphous films, the spokesman noted.



Metal lines fabricated in a process developed by IBM are shown in the left photo and enlarged in the right photo.

POS Terminals Aid Shoplifter Crackdown

DAYTON, Ohio — Electronic systems and sharp-eyed store employees are making life more difficult for shoplifters, who last year stole several billion dollars worth of merchandise, thus raising prices that legitimate shoppers have to pay.

Salespersons in many stores now have a direct and easy way to notify their security departments when they observe shoplifting.

Instead of picking up a telephone and calling the security department — a procedure that usually gives the shoplifter enough time to escape — the salesperson can merely push a few buttons on the keyboard of an electronic point-of-sale (POS) terminal that is normally used to record sales.

A message is printed on another terminal in the security department, immediately indicating the location of the suspected shoplifter. In a short time, security personnel can be there to deal with the problem.

Most systems also help thwart the use of stolen, lost or fraudulent credit cards as part of any normal credit card transaction.

When a charge purchase is being made, the salesperson enters the account number of the card into the POS terminal. Automatically, the computer to which the terminal is linked searches its file of so-called "hot cards." If such a card is being used, the computer notifies the salesperson, the security department and the credit department.

One West Coast department store reported that in the first few days of operation of its electronic system, 10 such attempted illegal transactions were discovered.

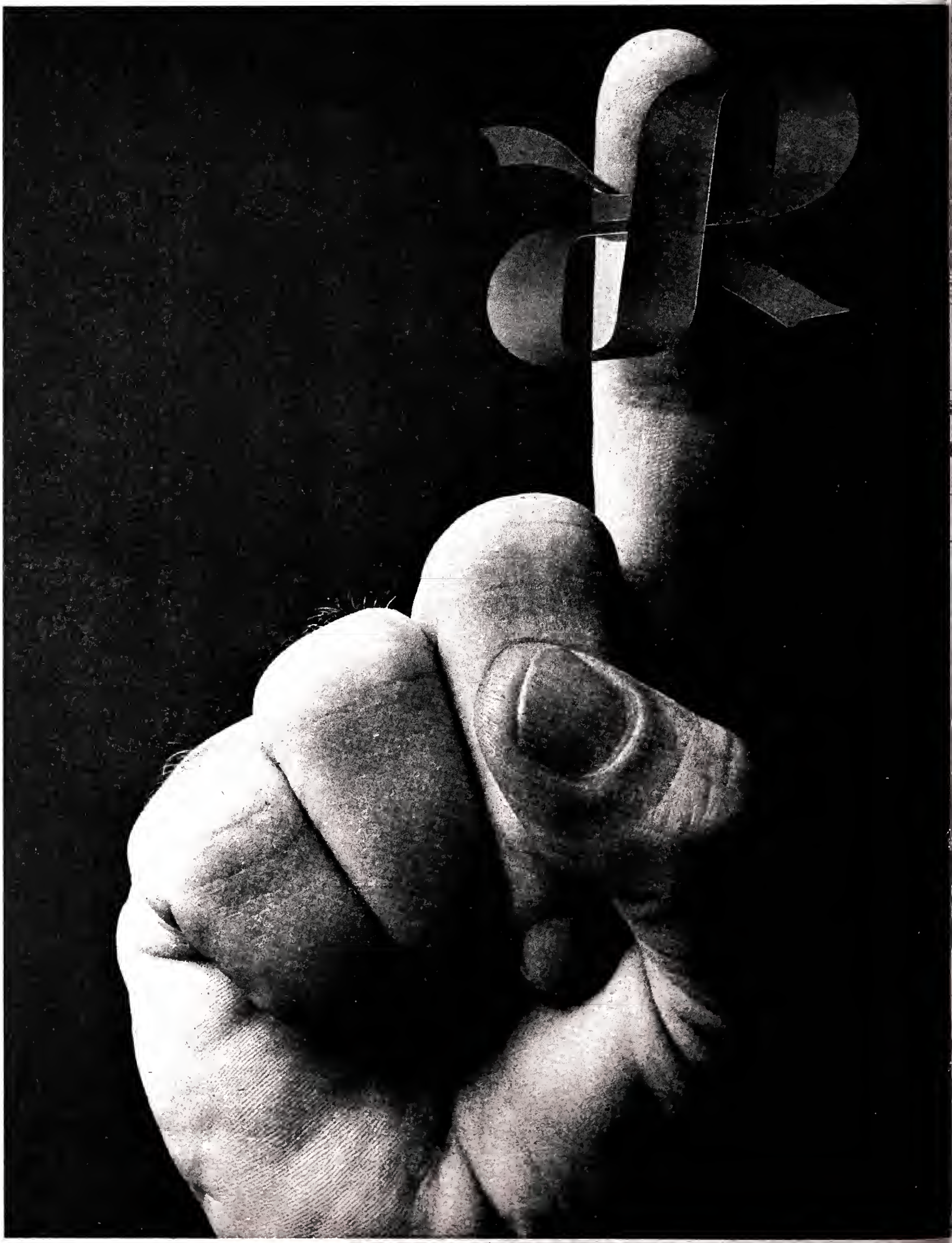
Schulke Leaving IEEE Post

NEW YORK — Dr. Herbert A. Schulke Jr. has resigned as executive director and general manager of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) effective next July 22.

He has served at the helm of IEEE since Jan. 1, 1975, bringing into operation an IEEE Service Center in Piscataway, N.J. and reorganizing institute operations to provide better fiscal management.

Schulke expressed a desire to engage more extensively in technical activities and to return to more engineering-related work.

The position Schulke is leaving has not been filled.



Human Factors at Work

World of EFT Seen Hinging on Consumer Acceptance

By Toni Wiseman
Of the CW Staff

NEW YORK — The world of electronic fund transfers (EFT) is one of opportunities for consumers, retailers and financial institutions alike, but it is also a world in which consumer wariness and opposition are real, according to Liam Carmody, director of product development for American Express.

"Today's world is one that's undergoing far-reaching changes in the ways in which customers can be served by all of the institutions which at times share those customers and at other times compete with each other," Carmody told attendees at a recent conference here.

"Some of the changes stem from the rapidly advancing technologies that are available to us. Others derive from the collective ingenuity of all of the companies involved.

"Still others have their basis in the volatile legislative and regulatory climate in which we operate," he said.

The real world of EFT is a complex one with conflicting human motivations and interests, he stated, citing direct deposit of Social Security checks as an example.

This, he said, is a perfect example of an EFT development which benefits everyone — the consumer, the government and the individual banking institution.

Only 30% Penetration

Yet there is only 30% penetration of this service and banks are being forced to print expensive brochures to sell the concept to their depositors, Carmody pointed out.

"Clearly, consumers in this case are resisting this benefit for what may seem to some of us an irrational and illogical reason," he said. "But when you're 74 years old and have very little else to do, it's important to be able to walk down to the bank with your check and your passbook and perform a useful financial transaction."

Direct deposit of government and other checks is going to grow, he said, noting the Air Force and a growing number of business organizations are directly depositing payroll checks. The overall benefits are just too great for it not to grow, he asserted, but it's happening in a world in which there is a great deal of opposition to it for very human reasons.

There are also reasons which are not so illogical, he added. "It's a very reasonable and pragmatic position to take that you don't want to give up one iota of positive float without something in return," he explained.

Consumer Resistance

As an example of consumer resistance, Carmody cited a direct debit program which American Express offered in California in early 1975.

Under the program, a statement was sent each month at the usual time for the cardholder's inspection. If he did not respond negatively to that statement within 11 days after its receipt, his account would automatically be debited for the amount of the American Express bill.

While the offer was made to thousands of cardholders and more than 10,000 responded, only 1,180 signed up for the service.

The discrepancy between positive response and actual participation can be accounted for by those who thought it was a good idea, but wanted to wait a year or so to see how it actually worked, Carmody said, adding this is a typical reaction to new technological concepts such as EFT.

Carmody outlined several successful American Express ventures into EFT, including Gold Bank cards used in a cash dispensing interchange program and its Travelers Cheque dispensing program.

Three-Sided Success

The successful three-sided relationship, involving American Express, its cardholders and the leading service establishments which accept American Express cards, is based on a payment system which works satisfactorily for all concerned, he said.

In contrast, the concept of national EFT systems at the retail level raises serious questions with which all those involved must be concerned, he stated.

"These questions, relating to the system itself, its ownership, its control, its costs, the manner in which accounts are accessed, the days and hours when the system can be accessed, the presence or absence of overdraft provisions, consumer attitudes toward establishments which would participate, the likely effect on a retailer's business if the system is inoperative or rejects a customer's card — these and many other questions must be carefully answered by anyone who would propose to establish such a system on a national basis," Carmody stated.

Three Shows Slated For Micro Hobbyists

Microcomputer hobbyists will be able to attend seminars and exhibits in Los Angeles, Philadelphia and Boston at the first regional Personal Computing Shows there.

The three shows will feature exhibits of the different kinds of microcomputers used in the home, school and small business environment.

Seminars will range from lessons on how to program a computer for the average person to lessons on how to construct a computer kit and intensive courses on microprocessors.

Schedule of Shows

The shows will be held in Los Angeles at the International Hyatt House, March 19-20; Philadelphia at the Marriott at City Line, April 30-May 1; and Boston at the Hynes Auditorium, June 18-19.

Tickets for the Personal Computing Shows will be on sale at the door for $10 for two days and $6 for one day.

Over 50 exhibitors are expected from all parts of the country and attendance is projected at 10,000.

The shows are sponsored by *Personal Computing Magazine* and the Southern California Computing Society.

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Editorial

The New Generation

The entry-level business system customer is being given some interesting options lately by, of all people, the mainframe vendors.

This could indicate a refreshing new trend and also provide some important growth indications about where these users are going.

First, IBM offered the System 32 user a Fortran compiler [CW, Jan. 24] to allow a level of programming sophistication not possible with the original Industry Application Program on which the system was born.

This appears to reflect a feeling on IBM's part that the System 32 user has outgrown his software short pants and is ready for his first long pair in the form of some original in-house Fortran coding capability.

If yesterday's entry-level users are indeed learning to more effectively utilize their systems and demanding more sophisticated features, it would be a heartening trend.

The first-time user has always been regarded as a type of customer that has to be allowed to operate only within predefined software boundaries. Now that user is saying he wants additional flexibility.

If so, this user will also develop a need for larger systems with additional storage and other peripherals as he begins to understand the benefits of DP operations for his business.

Second, Univac entered the small business system arena with the BC/7 that was described as competitive with the System 32 and Burroughs' recently introduced B80 (see story on Page 1).

The Univac announcement included news of a separate organization to serve the smaller user from a vendor which previously concentrated on the larger scale user. The BC/7 group appears to have many of the same goals defined for the IBM General Systems Division when it was first formed.

Rather than copy the minicomputer vendors, the mainframers appear to be telling the small user they will help him grow into full-fledged DP usage at a gradual rate which can be absorbed by his organization.

Unlike the IBM Series/1, the BC/7, System 32 and System B80 are end-user systems with name-brand vendor hand-holding as needed.

Upgrade paths appear possible as demonstrated by the System 32 software improvements.To the user, this is a hint that thee may be upgrade paths not available from systems houses that have custom-tailored software built to solve very limited situations.

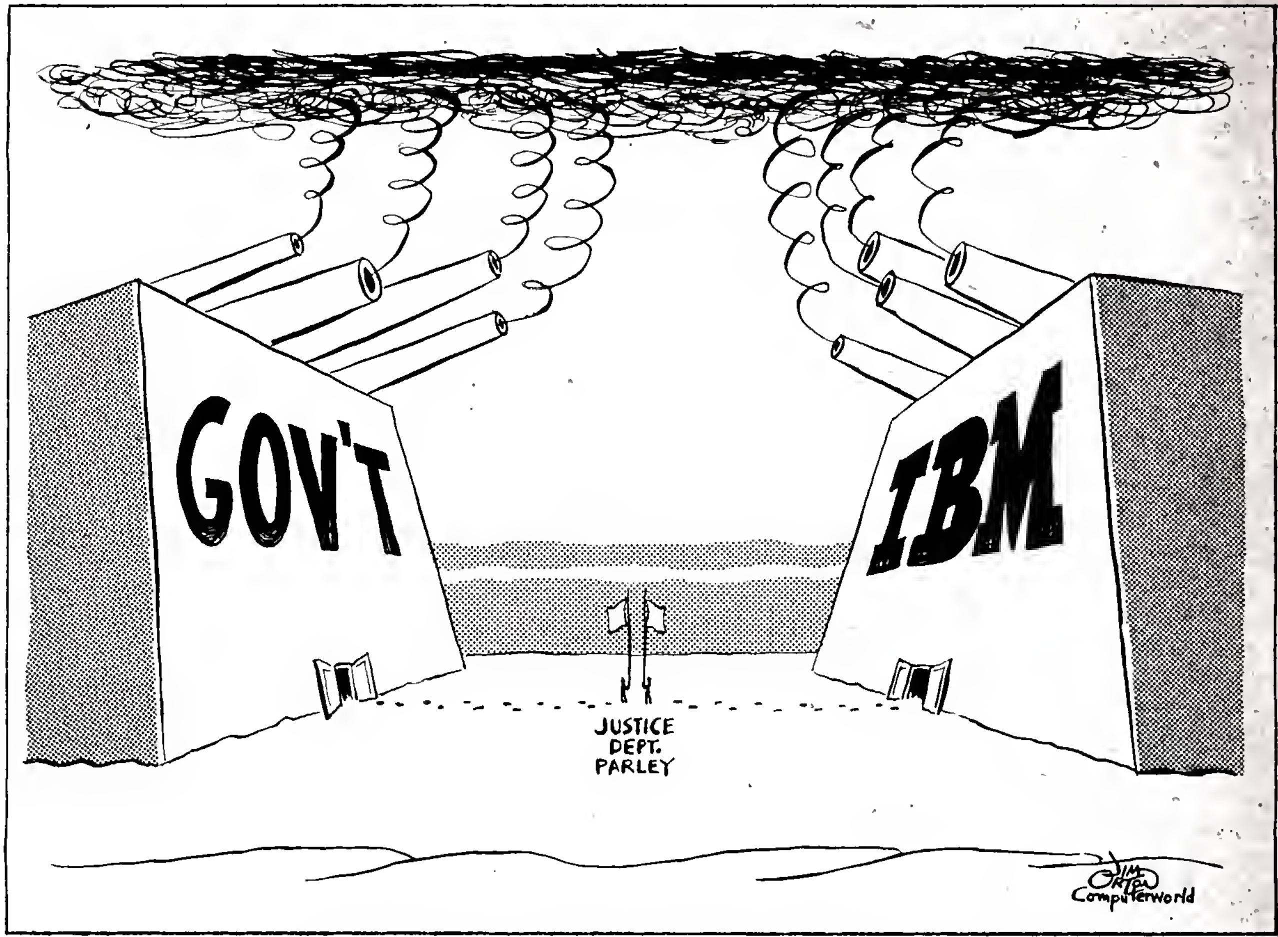
With the mainframe stamp of approval and support, the systems houses and minimakers will now develop new features and flexibility to attract the customer.

The entry-level user is dipping a toe in the water and being catered to like a June bride. And he is being encouraged in many varied ways to understand and benefit from more advanced DP usage.

Small business is entering the DP age.

Perhaps some of these users will grow to become tomorrow's new generation of innovators and there will be plug-compatible disks . . . and accelerators . . . and independent software monitors . . . and user-developed application packages . . .

It could be an exciting time. Again.



'What's This Rumor About a Settlement?'

Letters to the Editor

'Consultative' Salesmen Have Built-In Bias for Own Vendor

Although what C.J. Kurtz prophesized ["Consultative Selling Becoming Popular," CW, Jan. 10] is admirable in its intent, I cannot, as a consultant and systems designer, envision that any user will accept a vendor in a consultative role, knowing full well that the vendor is representing only his product.

It would be naive to assume a vendor will recommend alternative products for achieving his client's systems goals, especially if it means losing a sale.

In consultative selling, the salesman is personally and professionally committed to selling his product line, albeit in a more educated and assistance-orientd fashion.

A nonbiased and objective consultant offers the client his knowledge in systems design based on the myriad of products available on the market. The true consultant will design the most cost-effective system for his client; that means recommending the vendor offering the best price/performance capabilities.

In no way can a vendor's representative do this, except in comparing other products with his in a negative light.

I believe users should be aware of this and realize the limitations of the "consultant salesman's" objectivity.

Richard H. DuBois
President

Ag Systems Associates, Inc.
Norwalk, Conn.

Data Past

Five Years Ago
Feb. 2, 1972

NEW YORK — NCR and Control Data Corp. announced a joint venture including the establishment of a joint peripherals manufacturing company and plans for the design of a full range of compatible mainframes.

The "cooperative effort for the development of future central processing units" was designed to give the firms the "economies of scale" needed to compete effectively and serve present and future users, they said.

— — —

WASHINGTON, D.C. — AT&T told the Federal Communications Commission (FCC) it could not cite specific instances of harm caused to the telephone network by the direct interconnection of customer-provided equipment.

The Bell System response, together with letters from Western Union, GTE Service Corp., United Utilities and other carriers, was written after the FCC Common Carrier Bureau asked for details concerning harm caused by interconnected devices.

Interconnection tariffs required the installation of telephone-company connecting arrangements including Data Access Arrangements.

Eight Years Ago
Feb. 5, 1969

PHOENIX — PL/I standardization was postponed following a decision by the U.S.A. Standards Institute X.3 Committee.

The committee decided PL/I needed to be further developed internationally and said it intended to ask the International Federation for Information Processing and the European Computer Manufacturers Association to assist in the work.

It was thought the decision would prevent PL/I from becoming a standard language before 1972.

— — —

MINNEAPOLIS — Honeywell entered the service bureau business by opening seven time-sharing centers and 10 batch processing centers. The regional time-sharing centers used the Honeywell Series 16 time-sharing system.

The operation was run by the Information Services Division. The services were broken down into five major groups: data preparation, systems analysis, programming, processing of data and preparation of finished reports.

Blowing Smoke Not Sufficient

I should like to thank Carol Anne Ogdin for her critical letter [CW, Jan. 24]. The very fact that she has risen to the defense of the Federal Aviation Administration (FAA) system is indicative the system needs defense.

As Ogdin should now be aware, the "user" has been contacted ["FAA Air Traffic Control System: Rush to Automation?" CW, Jan. 17], and has contradicted Ogdin's statement that the control functions exist only in the cockpit. I myself have flown enough to know severe sanctions exist to the pilot who does not follow the direction of the ground "advisers."

Future articles in the ". . . And in This Corner" column will attempt to include ground controllers' perspectives. But Ogdin should be aware that the real user in this case is not the controller and not the pilot, but the flying public which has every right to know beyond the shadow of a doubt that it is protected.

The evidence is that this guarantee does not exist. If it did, the controllers would not be claiming the severity of outage that they claim.

My role in this interchange is to raise the questions. Unfortunately, Ogdin's answer shed little additional light on those questions. One cannot answer the question sufficiently by merely blowing smoke at the questioner.

Perhaps it is time for the question to be blown wide open with contributions to the discussion by the FAA.

Kenniston W. Lord Jr.

N. Chelmsford, Mass.

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Detach here, fold, and place in post-paid envelope attached through binding.

Bell's Antitrust Decisions Tend to Favor 'Big Guys'

Historical Perspective

By E. Drake Lundell Jr.
Of the CW Staff

The antitrust record compiled by Judge Griffin B. Bell, President Jimmy Carter's choice for U.S. Attorney General, will give little comfort to those hoping for a vigorous prosecution of federal antitrust laws.

As an appeals court judge, Bell has consistently handed down rather strict interpretations of the antitrust statutes that generally tended to favor the larger corporations engaged in the suits over which he presided.

Bell's record is important because he is in charge of prosecuting the government's ongoing antitrust actions against both IBM and AT&T — two of the largest cases ever brought in the 81-year history of antitrust enforcement in the U.S.

Nevertheless, Bell's record does not clearly indicate what direction he will take in enforcing antitrust laws as head of the Justice Department.

Bell compiled his record during 15 years' service as a judge on the Fifth Circuit Court of Appeals in New Orleans. A computerized search by the Lexis system — a legal retrieval service offered by Mean Data Central — revealed Bell participated actively in 13 antitrust-related actions while sitting on the appellate bench.

Several of those cases were dismissed on technicalities or were only tangentially antitrust matters. But five cases are of interest in relation to his position on antitrust enforcement.

In all of those cases, the appeals court — in decisions written by Bell — upheld lower court rulings at least in part. In three cases involving a smaller defendant against a larger corporation, the larger company was found not guilty of monopolization charges.

In no case did Bell have any apparent connection with an antitrust suit brought by the Justice Department, the agency he is now heading.

Noteworthy Cases

It is difficult to generalize about disparate court cases in order to piece together the philosophy of a judge, legal sources indicated recently. Several cases are noteworthy, however.

For example, in Panotex Pipe Line Co. vs. Phillips Petroleum Co., the appeals court upheld a lower court decision finding Phillips not guilty of monopolization, even after saying the lower court had erred in not allowing certain controversial documents into the record.

Bell's decision in the case stated one controversial document should have been admitted. That document defined certain oil reserves in the geographic area of the suit and brought up the possibility of Phillips' raiding the customers of another company.

However, Bell said, it would not have made any difference to the case since other evidence supporting its contentions was not brought up at the trial.

In the current U.S. vs. IBM antitrust case, the government seems to be relying to a great extent on internal IBM documents to show the corporation intended to stifle competition. IBM has fought up to the Supreme Court to keep many of these out of the case.

Another item in the Panotex vs. Phillips case was the finding by Bell that Phillips had no part in stopping a bank from lending money to Panotex, even though the chairman of Phillips was a bank director at the time.

In addition, Bell found that Phillips was willing to take "less than the number" of contracts in the area where it competed with Panotex than it did in other areas in order to put in a pipeline and that it immediately reduced prices as soon as it had competition from Panotex.

However, Bell said this was not an attempt at monopoly or an example of predatory conduct because these actions were not unprofitable to Phillips.

In the government case against IBM, the government is arguing that IBM reconfigured equipment and reduced prices in the peripherals marketplace in order to forestall or stifle competition.

IBM contends, however, that even if that is true, it did not reduce prices below costs and therefore cannot be found guilty of predatory practices.

Another case also involves Phillips Petroleum, which this time was sued by Robert H. Martin. The Chemical Bank was a codefendant with Phillips in this case and was represented by Cravath, Swaine and Moore — which is currently defending IBM against the government suit.

In this case, Martin had an option to purchase a gasoline plant and went to Chemical Bank for a loan. The bank was interested and immediately entered into negotiations.

After a complicated series of maneuvers while negotiations on the loan were continuing, Chemical called in Phillips, which "had a substantial deposit and a cordial business relationship with the bank," according to the opinion, and offered Phillips the property.

This happened just a few days before Martin's option to purchase the gasoline plant expired.

In the course of time, Martin's option did expire and Phillips picked up the property. Martin sued, claiming the bank and the petroleum company had conspired against him.

The lower court found against Martin, and Bell concurred.

In his decision, Bell said Martin did not show he was really prepared to enter the business since he had no experience in operating gas plants and no financing except the sum for which he asked the bank. Therefore, Bell said, Martin had no business that could have been injured by the action of the bank and Phillips and he upheld the lower court decision against Martin.

Although these cases — and the others on which Bell has written decisions — do not have a direct bearing on the current government cases against IBM and AT&T which Bell will prosecute — or settle — as Attorney General, they do indicate a conservative set of mind in the antitrust area.

But while Bell's strict interpretations of antitrust law have seemed to favor larger corporations, one Justice Department attorney said "the real key" to what Bell will do in this area will be shown by who he appoints to head the Antitrust Division.

System Parameters Indicate Unhealthy Systems Use

The Taylor Report
By
Alan Taylor, CDP

Something has happened to impact the system that Eastern Airlines has to collect fares on the shuttle through the use of Master Charge.

In December, my monthly Master Charge account showed a number of charges for $35 (the appropriate amount) without identification in the appropriate field and showed duplicate charges except for reference numbers for the same dates.

The reference numbers were checked against ticket numbers, but showed no relationship that I could see.

Following practice, I asked the bank to check into the matter as to whether duplication had in fact occurred, and I paid two out of the four $35 charges.

In December, the bank wrote to me that it had confirmed there were errors involved, but did not give details about what the investigation found. At the same time, it credited back the $70 that I had not paid.

Now I have received the next monthly statement — and the problem seems to be spreading (see box).

For Nov. 29, for example, the statement lists not merely a duplication of the unidentified DESC MISSING ON VOUCHER charges, but a triplication. Indeed, two of them have the same reference number — X5001686.

Altogether, there are eight such suspect charges spread over a one-month period and overlapping into prior months.

The airline, however, is not the only problem area on the account. For instance, take the Nov. 17th charge for $46.45. Now, I am as friendly as the next guy, but I don't like paying that amount just for someone to say "HI"!

The HI entry has me absolutely baffled. It doesn't ring any bells. Unlike any of the other items, there is no entry in the location field (which appears to have 11 positions for a town and two for the state, although different vouchers use different field lengths).

It took the system six weeks to get the HI charge to me — and it is possible that it is proper. But my memory is not jogged by HI and now I know errors are occurring in the system, so I am certainly questioning it.

It's a "Halo" challenge effect because I might previously have let it slide by on trust — but not now. I doubt that I will be the only one to question this — and that is the point of this column.

What has probably happened is that the drive to save paperwork and input preparation volumes together with a system requirement to process any input, no matter how incomplete, have combined to reach a failure plateau.

High-volume input accounts (such as Eastern Airlines) have cut down on input; and the result has been both system error and reduced usefulness of output.

In fact, the basis of the Shawmut system is that Eastern, like all accounts, does its duty and provides adequate identifying information. Personally, I think it would be simple for Eastern to identify even the flight as well as the direction of travel. Certainly using a.m. or p.m. to qualify the item would be a help.

In the area of shuttle airlines with skeleton information, the Master Charge system depends on the quality of input being high for accuracy — and this is a duty that Eastern is not providing.

I really don't think Shawmut simply is dropping the information after receiving it from Eastern. It could do this once or twice, but not every single time for 12 times in a row.

So, the error problem starts with Easter, but it doesn't stop there. That is the message given by this month's statement. No way could the same reference number be correctly applied to duplicate correct entries as the statement shows for reference number X5001686. Shawmut editing is at fault here.

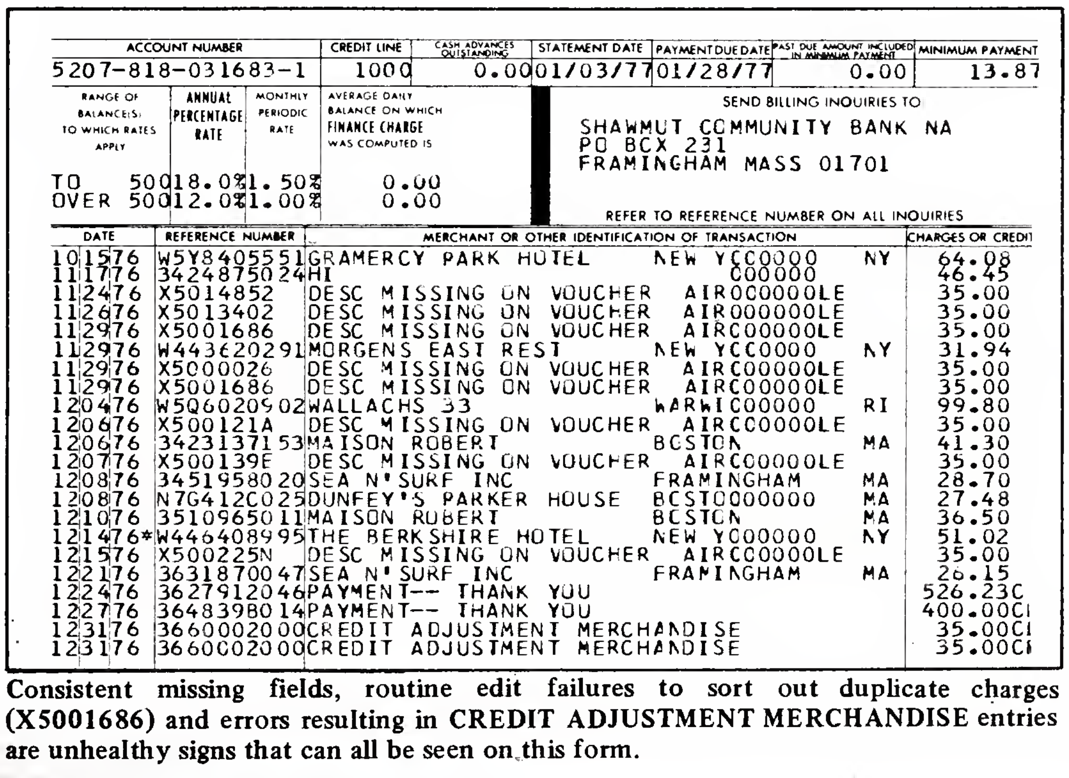
Whether it is Eastern, Shawmut or some intermediate area that is actually creating the duplicates, I don't know. I suspect problems with a sort routine somewhere (together with inadequate control provisions), but I don't know.

However, I do know inadequate controls at the query investigation end — this time at the Shawmut Community Bank. (The main computers are with the major bank of the group; Shawmut Community is simply a local bank which receives my queries).

When Shawmut received my query around Dec. 22, it didn't take long to find the error and, as the statement shows, it credited the challenged charges within the statement period. This happened to be the last day of the period, so the X5001686 duplication must have occurred by then. Yet, the investigation did not go on to determine whether any further errors needed weeding out. It simply aborted at the current challenge — and that is inadequate.

The fact that the bank curtailed its examination of challenged areas is a sign that the most precise tool currently available to DPers in their constant fight for accuracy is being underused. Healthy systems parameters are to be found not in the number of unchallenged payments, but in the randomness of challenges. Challenges — and particularly verified ones — that show any sort of pattern indicate with precision the weaknesses of current system use.

Healthy parameters, based upon examination of both challenges and errors, are part of the vital signs of system use. They are applicable to almost all DP activities, not merely to credit card operations. And they are valuable in keeping matters in good shape and in an organized systematic way that can easily be a programmed part of the system.



ACCOUNT NUMBER	CREDIT LINE	CASH ADVANCES OUTSTANDING	STATEMENT DATE	PAYMENT DUE DATE	PAST DUE AMOUNT INCLUDED IN MINIMUM PAYMENT	MINIMUM PAYMENT
5207-818-031683-1	1000	0.00	01/03/77	01/28/77	0.00	13.87

RANGE OF BALANCE(S) TO WHICH RATES APPLY	ANNUAL PERCENTAGE RATE	MONTHLY PERIODIC RATE	AVERAGE DAILY BALANCE ON WHICH FINANCE CHARGE WAS COMPUTED IS
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OVER 500	12.0%	1.00%	0.00

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DATE	REFERENCE NUMBER	MERCHANT OR OTHER IDENTIFICATION OF TRANSACTION			CHARGES OR CREDIT
101576	W5Y8405551	GRAMERCY PARK HOTEL	NEW YCC0000	NY	64.08
111776	3424875024	HI	C00000		46.45
112476	X5014852	DESC MISSING ON VOUCHER	AIROC0000LE		35.00
112676	X5013402	DESC MISSING ON VOUCHER	AIR000000LE		35.00
112976	X5001686	DESC MISSING ON VOUCHER	AIRC00000LE		35.00
112976	W443620291	MORGENS EAST REST	NEW YCC0000	NY	31.94
112976	X5C00026	DESC MISSING ON VOUCHER	AIRC00000LE		35.00
112976	X5001686	DESC MISSING ON VOUCHER	AIRC00000LE		35.00
120476	W5Q6020902	WALLACHS 33	WARWIC00000	RI	99.80
120676	X500121A	DESC MISSING ON VOUCHER	AIRC00000LE		35.00
120676	3423137153	MAISON ROBERT	BCSTCN	MA	41.30
120776	X500139E	DESC MISSING ON VOUCHER	AIRC00000LE		35.00
120876	3451958020	SEA N'SURF INC	FRAMINGHAM	MA	28.70
120876	N7G412C025	DUNFEY'S PARKER HOUSE	BCST0000000	MA	27.48
121076	3510965011	MAISON RUBERT	BCSTCN	MA	36.50
121476*	W446408995	THE BERKSHIRE HOTEL	NEW Y000000	NY	51.02
121576	X500225N	DESC MISSING ON VOUCHER	AIRC00000LE		35.00
122176	3631870047	SEA N'SURF INC	FRAMINGHAM	MA	26.15
122476	3627912046	PAYMENT-- THANK YOU			526.23C
122776	3648398014	PAYMENT-- THANK YOU			400.00CI
123176	3660002000	CREDIT ADJUSTMENT MERCHANDISE			35.00CI
123176	366C002000	CREDIT ADJUSTMENT MERCHANDISE			35.00CI

Consistent missing fields, routine edit failures to sort out duplicate charges (X5001686) and errors resulting in CREDIT ADJUSTMENT MERCHANDISE entries are unhealthy signs that can all be seen on this form.

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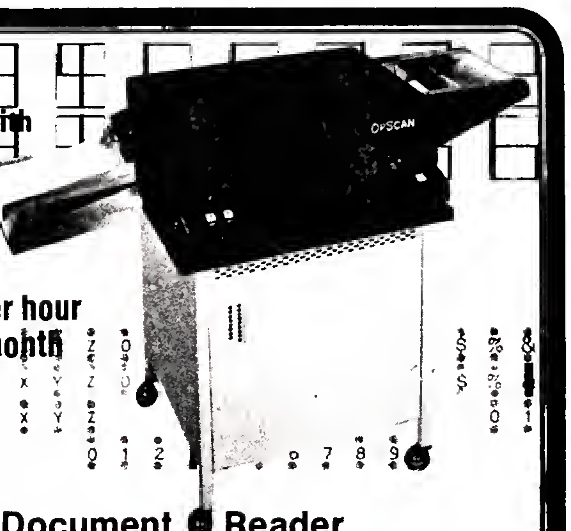

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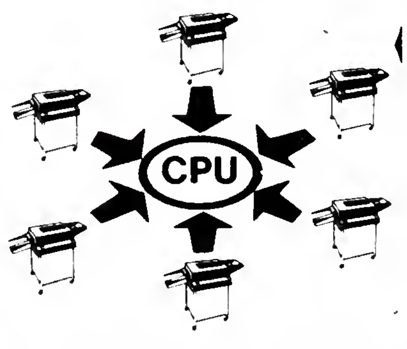

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The Human Connection

Software Must Satisfy Client — Not Gratify Programmer's Ego

By Jack Stone
Special to Computerworld

As the great debates on program quality and programming productivity rage on, the search for performance policies which can provide valid guidance to programming management continues.

One situation where the end results are undeniable, complete and final is the case of the small independent software producer. If this entrepreneur shows black ink on the bottom line more often than not, has no nonperformance litigation in process and has cash on hand to meet the next three months' payrolls, the chances are excellent his performance policies are worth noting.

William Delaney, president of Analysis and Computer Systems, Inc., a Burlington, Mass., software firm, has offered to share with the industry the guidelines he uses in his programming operations. The thoughts given below are excerpted and edited from his unpublished paper, "Robust Programming":

"Some new words have been creeping into the software development lexicon. We see words like 'robustness,' 'fail-soft,' 'fault toleration,' 'graceful degradation' and even 'forgiveness' used to describe desirable software characteristics. The general ideas underlying these words seem to be the following:

"Programs should be designed and written so a single error will not have a catastrophic effect on the entire system. Furthermore, software must be designed so it is both easy for programmers to make changes and 'forgiving' of operator errors.

"However, problems of this nature have been all too common in the past and continue to plague the industry.

"The situation stems from the fact that programmers tend to isolate themselves from the purpose for which the software is being created in the first place. Programming is a type of art form or craft in which different people will perform the same job in different ways, but quality and operating efficiency can vary all over the place.

"I have observed variances in programmer efficiency of up to 10 to 1. In one case, it took one person a week to do a job and another person 10 weeks to do the same or similar job. In some cases, I noted the person who took longer did the poorer job.

"I think the problem results, in part, from the woolly thinking of many programmers who believe the software they create is an extension of themselves, much like the artist who views his painting as an extension of his creative ability.

"While creating a painting, however, the artist gives little thought to who will buy it, where it will be displayed, or whether it will fit properly with paintings of other artists in some grand exhibit.

"This attitude may be understandable in fine arts, but has no place in the software business. The programmer does not work alone. There is always a customer or end user who is paying for the project and who wants and deserves a product that can be used effectively in the customer environment.

"Many times I have seen programmers take a program design, race into coding and checkout and produce something of little value to the end user. I have seen programmers actually argue with a customer in attempting to justify the results of his programming effort.

"The point that what we produce belongs to the customer seems difficult for some programmers to grasp because of their ego involvement in the development.

"These guidelines for programmers should produce 'robust' software that is efficient, usable and useful for the customer:

"1. Keep the end user in mind throughout the entire software development process. (What is it all for and why?)

"2. Be sure you know not only what you are going to code but why, and know this before you start. In knowing why you write a program, you get a better understanding of what the end user intends to do with your software.

"3. Don't rush into coding prematurely. The more time you spend in analysis and design, the fewer errors you will have to correct during checkout.

"4. Design the program in anticipation of changes to come. You will have less difficulty in accommodating changes when they arrive — and you can be sure they will.

"5. Don't consider your job complete until the program documentation has been written and read by another programmer so he can understand what you developed and, if necessary, be able to modify it without undue problem.

"6. Don't get 'cute' when coding. You add to the cost of program maintenance and create confusion at the worst possible time, which is when your software becomes operational.

"7. In real-time system development, remember you are not alone. What you do can and will affect the work of others. Your work is part of a bigger picture; it must fit into the pattern and function of other efforts in a unified way.

"8. Don't be afraid to admit errors or to ask for help. Don't hide your problems; we will find them out sooner or later, and it's better if we find out sooner.

"9. Even though we require documentation to be prepared in accordance with certain standards, the outcome will not be useful unless you fully understand what it is for and how it will be used.

"In conclusion, try to get your ego satisfaction from a satisfied customer, not from being the only one in the company who can write a 19 nested DO loop. The important and long-term rewards go to those who put a smile on the customer's face and keep it there."

Readers are invited to submit letters pertaining to management and personnel issues in the DP setting for answer in this column. Letters should be sent to Stone at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

Letters to The Editor

Aptitude and Attitude Outweigh Experience

I assumed the intent of Jack M. Wolfe's article ["Novice DP Majors Outscore Veteran DPers," CW, Jan. 10] was to provide better programming employment opportunities for inexperienced computer science graduates.

In this respect, I agree with Wolfe: Individuals should not be eliminated just because they lack specific experience. I believe aptitude, intelligence and attitude are most important.

Even though he stated all factors should be considered when evaluating individuals and computer science graduates should not automatically qualify for employment, I believe there still exists the possibility the results will be misinterpreted.

There was no mention of the education level of the experienced group. In other words, how did the novice group compare to the experienced group when only individuals with degrees were considered?

Art Jandreau

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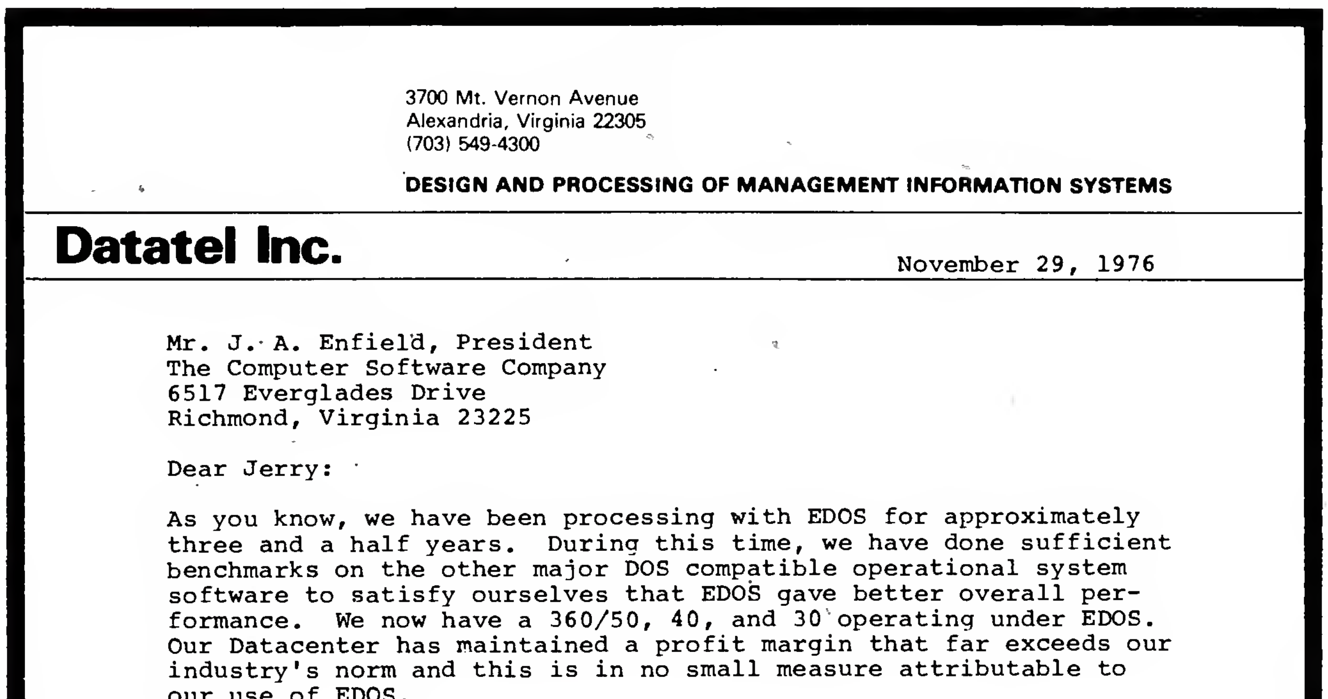

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DESIGN AND PROCESSING OF MANAGEMENT INFORMATION SYSTEMS

Datatel Inc.

November 29, 1976

Mr. J. A. Enfield, President
The Computer Software Company
6517 Everglades Drive
Richmond, Virginia 23225

Dear Jerry:

As you know, we have been processing with EDOS for approximately three and a half years. During this time, we have done sufficient benchmarks on the other major DOS compatible operational system software to satisfy ourselves that EDOS gave better overall performance. We now have a 360/50, 40, and 30 operating under EDOS. Our Datacenter has maintained a profit margin that far exceeds our industry's norm and this is in no small measure attributable to our use of EDOS.

In September, we indicated that we would be willing to be a test site for the new Release 5.5 of EDOS. The system was installed in late September for which I can only say, "Thank You." The reasons for my thanks are many, but I will only discuss the major two.

1. A Clean Release - Virtually all new releases have bugs. The 5.5 is the first release that was installed at Datatel and stayed installed from day one. The system was very clean, and as of today we have only a few remaining minor bugs.

2. The System's Performance - The plain truth about 5.5 is that it performs at a level far superior to any other EDOS release to date. I have a shop that prints approximately 3 million lines per day and we have seen a twenty percent improvement in printing with Release 5.5. Overall, system thruput is up fifteen percent, over the 35 percent we were already obtaining.

What all this means to Datatel is that the 360/50 and 30 under EDOS/GEMINI can more than handle my current needs and those that I can foresee for the next year. The elimination of the 360/40 and its related expense will result in a cost savings to Datatel of approximately $8,000 per month.

Better performance, reduction in cost at no additional cost, and all from EDOS. That's the reason for my "Thank You." Your Company's dedication to your products has helped us in the past and now once again, for today and tomorrow.

Sincerely,

Paul

Paul T. Hawkins
Vice President, Operations
DATATEL, Inc.

EDOS SEMINAR SCHEDULE

BOSTON
Mon. Feb. 28

DALLAS
Tues. Mar 1

HARTFORD
Wed. Mar 2

HOUSTON
Thur. Mar. 3

NEW YORK
Mon. Mar. 7

ST. LOUIS
Mon. Mar. 7

PHILADELPHIA
Wed. Mar. 9

CHICAGO
Wed. Mar. 9

PITTSBURGH
Fri. Mar. 11

MINNEAPOLIS
Fri. Mar. 11

CLEVELAND
Mon. Mar. 14

DETROIT
Wed. Mar. 16

CINCINNATI
Fri. Mar. 18

WASHINGTON
Tues. Mar. 22

DENVER
Wed. Mar. 23

SEATTLE
Fri. Mar. 25

SAN FRANCISCO
Mon. Mar. 28

ATLANTA
Tues. Mar. 29

LOS ANGELES
Wed. Mar. 30

MIAMI
Thur. Mar. 31

SAN DIEGO
Fri. Apr. 1

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User 'Fairly Happy'

Package Lets College Provide Basic Under DOS/VS

By Don Leavitt
Of the CW Staff

WORCESTER, Mass.— Installations running under IBM's DOS/VS usually don't — or can't — consider Basic one of the languages they can offer their users. But Holy Cross College here is doing exactly that, and the man in charge of the project is "fairly happy" with the package that made it possible.

The college has a 256K 370/125 on which it has configured five partitions. One is dedicated to the interactive Basic language processor/Coursewriter combination developed by the Board of Cooperative Educational Services (Boces) of Southern Westchester County in New York.

The Boces implementation is Holy Cross' second attempt to provide Basic, and it is far better than the first, according to Thor Olson, associate director of the computer department. Boces Basic replaced IBM's Interactive Terminal Facility (ITF) at the beginning of the 1975-76 academic year.

The ITF Basic was a "very basic Basic," Olson said. Even though it was described as "Dartmouth Basic," it had few of the extensions Dartmouth had implemented since it introduced its Level 1 years ago.

The Boces implementation was just about the only thing available when Olson was looking for a replacement, so he had no elaborate evaluation process. But he's pleased nonetheless, he said.

The language capabilities — apparently a modified form of the Basic II used by Hewlett-Packard on its HP 2000s — are "very good mathematically," according to Olson.

Boces Basic includes many functions not usually found in Basic. "Actually [Boces] has implemented a number of functions — matrix manipulation, for example — normally found in such languages as APL," Olson noted.

The package includes support for character strings and string manipulation, but does not permit use of character arrays. That, to Olson, is the system's only shortcoming.

Neither Holy Cross nor any of the other users of Boces Basic have found substantial bugs in the coding. The reliability is confirmed, in Olson's view, by the fact that Boces hasn't had to provide a lot of maintenance releases: "It's only on Version 1.3 right now," he noted.

The Boces Basic portion of the package is an interpreter and that prevents it from being universally useful. Number-crunching applications aren't too successful on it, Olson reported, but in general "we're happy with it."

The package utilizes IBM's Coursewriter system as a teleprocessing monitor and that adds a bit of extra overhead — and at least one problem that IBM seems unwilling to solve. Even when the system is idling with no users, it requires at least 40K bytes of storage, Olson said.

With people actively using it, the working set goes up to 80K to 120K and the number of concurrent users doesn't really affect that figure very much. Once the first couple of users are logged on — and Holy Cross has eight terminals tied to the system — "everything that's going to be resident is already in place," Olson said.

Response time goes down as more and more users are logged on and jobs are flopped in and out of main memory, but memory requirements themselves do not increase, he added.

The only times the overhead becomes a problem is when the students "suddenly realize they better get done what they should have been working on all semester. Those are the times we're really hurting," Olson said.

Only One Real Problem

The only real problem Holy Cross has had with the Boces package has nothing directly to do with the Basic interpreter, but rather with the Coursewriter portion from IBM. The software provides workspaces within which users can build their own code — as Boces did — to utilize Coursewriter's I/O support.

But linkages to the workspaces sometimes fail when Coursewriter is used in a VS environment. This is a problem of which IBM has been aware for a year and a half, according to Olson, but hasn't come up with any solution.

"I'm beginning to get the feeling that Coursewriter is no longer an active product, though IBM won't come out and say so," the Holy Cross user said.

'Docit' Uses Proclib to Aid Operations

NEWTON, Mass.— The Docit package from Arkay Computer, Inc., described as "a totally new concept in documentation" for IBM OS and OS/VS installations, generates a user-controlled range of printouts for both operations control and programmer support, the vendor said.

Docit utilizes the installation's Proclib or cataloged jobstream information as the basis for its reports. Since this source must contain current data, Arkay said, the documentation the package produces must be accurate.

CRT Call Out

To meet time-critical problems, full reports or pertinent portions of them can be called out on a CRT rather than waiting for hard-copy printouts.

Of greatest interest to operations personnel, according to Arkay, are printouts of restart and recovery instructions in order by executable steps.

The restart report report shows every data set and symbolic parameter that must be overridden and notes the conditions under which a data set would not be available for restart within the jobstream.

The rerun report shows data sets that must be uncataloged or scratched before a job can be rerun. Since the need for a rerun may be brought about in various ways, Docit prepares an "action sheet" that covers all conditions, the vendor continued.

Docit also highlights jobstream logic with a tabular flow chart. Each step is shown with its input and output and descriptions of the characteristics of each file.

The package also prints programmer comment cards and displays symbolic parameter formats, completion codes and completion code meanings so errors can't be made in interpreting codes through reference to manuals, a spokesman added.

A full symbolic parameter listing includes an indication of the default value, the steps in which the parameter is used and any DDnames that make use of it, he noted.

The package requires 75K to 80K bytes of storage and is available under permanent license for $5,000, Arkay said from 24 Manor House Road, Newton, Mass. 02159.

CMG Units to Meet

Users will be getting together in two different sections of the country in February as regional chapters of the Computer Measurement Group (CMG) meet in New Orleans and San Francisco.

The Measurement and Evaluation Group has set its meeting for Feb. 8 at Foremost-McKesson, 1 Post St., San Francisco. More details are available from Joan Rampelberg at Foremost-McKesson.

The Southern CMG has picked the Hyatt Regency in New Orleans as the site for a Feb. 10-11 meeting. Registration is $10; additional information is available from Richard Comeau, c/o J. Ray McDermott, 1010 Common St., New Orleans, La. 70112.

'Mentext' Edits OS, OS/VS Data

PALO ALTO, Calif.— The Mentext software from Mentel, Inc. is said to support IBM OS and OS/VS installations with interactive text editing, remote job entry and retrieval, data set and catalog management, document processing and an interpretive programming language.

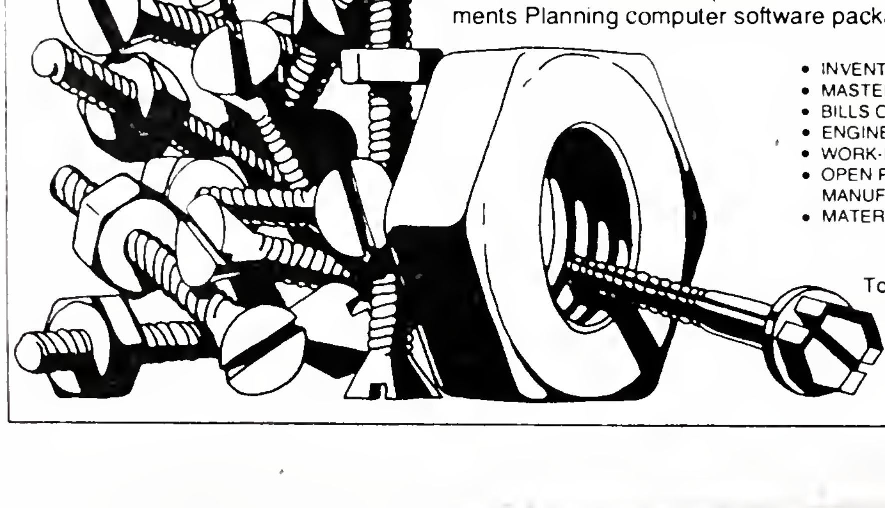
The package can be used to edit accounting data, correspondence, source programs, test data, JCL statements and "other information" according to Mentel. The system is currently being used by word-processing and operations personnel, accountants, engineers and programmers.

Mentext supports IBM 3270 and 2741 and teletypewriter terminals, locally attached or over remote teleprocessing lines. Significant highlights are said to be its responsiveness to the user and its efficient use of machine resources.

A user can submit jobs for batch processing and retrieve the output for analysis at a remote terminal, a spokesman noted.

The package can be installed in less than an hour, he claimed, and requires no modification of IBM's operating system coding.

Mentext is available on a perpetual license for $25,000 (MFT or VS1) or $36,000 (SVS, MVS or MVT). Monthly license plans are also available, the vendor said from P.O. Box 118, 459 Hamilton Ave., Palo Alto, Calif. 94302.



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Cullinane Corporation's IDMS has been named by Datapro Research Corp. to its 1976 Honor Roll. IDMS led all other database management systems in the fourth annual survey of proprietary software users, who compared survey results for all database management systems based on seven key categories. For all systems measured, IDMS earned the highest rating in five of the seven categories. For systems operational on IBM equipment, IDMS rated highest in six of the seven areas. IDMS was also the only DBMS to improve its ratings in every one of the seven categories when compared to the 1976 survey results.

The chart at right shows how all Database systems rated.

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Package & Vendor	Weighted Average User Ratings*							
	No. of users reporting	Overall satisfaction	Throughput/Efficiency	Ease of installation	Ease of use	Documentation	Vendor technical support	Training
ADABAS Software AG	4	3.3	3.3	3.3	3.5	2.0	2.8	2.5
Datacom DB, CIM	8	3.3	3.4	3.0	3.4	2.3	3.4	3.1
DBOMP, IBM	48	3.0	2.6	2.4	2.7	2.5	2.7	2.4
DL/1, IBM	29	2.6	2.4	2.3	2.4	2.4	2.5	2.6
DMS-II, Burroughs	5	3.8	4.0	3.6	3.6	2.8	3.0	3.2
GIS, IBM	7	2.4	2.1	2.1	3.0	2.7	2.6	2.3
IDMS, Cullinane	**17**	**3.8**	**3.3**	**3.4**	**3.6**	**3.0**	**3.6**	**3.5**
IMAGE, Hewlett-Packard	11	3.6	3.3	3.7	3.2	2.8	2.9	2.7
IMS, IBM	33	2.9	2.4	2.2	2.5	2.8	2.8	2.9
INQUIRE, Infodata	6	3.2	2.2	2.7	3.0	2.5	2.8	2.6
Model 204, C.C.A.	3	3.7	3.3	3.3	3.3	2.7	3.3	2.7
SYSTEM 2000, MRI Systems	21	3.0	2.3	2.9	3.5	2.4	2.7	2.1
TOTAL, Cincom Systems	113	3.5	3.1	3.4	3.4	2.8	3.0	2.8

All weighted averages are based on a scale of 4.0 for Excellent.
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'Ramis II' Supports Non-Procedural Data Management

PRINCETON, N.J. — An updated version of the Rapid Access Management Information System (Ramis) from Mathematica Products Group, Inc. is said to "completely integrate" the technologies of nonprocedural languages and data base management.

In addition, Ramis II provides several capabilities that were either missing or in limited form in the original version. The update includes extended security features, extensive logging capabilities and "a great increase" in report-formatting flexibility, a spokesman reported.

Support for a nonprocedural language — especially to help in accessing a data base — is not unique, but "with each release, the Ramis language has grown continually more consistent with everyday English," the vendor claimed.

The nonprocedural approach has been extended from support of report writing and data retrieval to records management. The system designer can create "an extensive range" of data validation procedures and descriptions of complex data input structures in the higher level language, relieving the application programmer of such chores, the spokesman explained.

The report-formatting flexibility comes from support of what Mathematica calls "variable spacing." Previous releases have handled such tasks as horizontal spacing of columns without user input; now the user has the opportunity, but not the necessity, of specifying where fields are to be located.

This has obvious implications in terms of working with preprinted forms such as the 941-As and W-2s used for reporting income tax and Social Security withholdings, the spokesman noted.

Options available with the basic Ramis II include a run-time executive language, graphing capability, a Report from External Files facility, procedural language interface, financial planning system and usage accounting system.

Ramis II runs on IBM 360/370 equipment under OS or OS/VS, including TSO and VM/370, or the VP/CSS environment on the National CSS, Inc. network.

Until March 31, Ramis II is available under a 25-year lease ranging in cost from $20,000 to $65,000 depending on options selected. After that date, the range will be $34,000 to $84,500.

One- and three-year lease plans with monthly payments are also available, Mathematica said from P.O. Box 2392, 14 Washington St., Princeton, N.J. 08540.

'SRR' Handles Multiple File Correlations

ATHENS, Ga. — The Special Report Writer (SRR) package now available from Cosmic can perform multiple correlations on files containing several data hierarchies; it functions in an IBM 370 environment, a program abstract from the clearinghouse reported.

As with other batch-oriented information retrieval systems, SRR is controlled by user-written parameters specified in "a simple notation, readily learned by non-DP oriented personnel," Cosmic said. The package was designed primarily for manipulating a financially oriented data base.

SRR is said to act as a cross-correlation routine, checking each member of the data base against the requirements the user request imposes on certain data elements. No limit is imposed on the number of correlations requested, a spokesman added.

If no member of the data base meets all the requirements, a negative report is generated, he noted.

Report Families

"Families" of reports can be generated. A family consists of reports for which all but one of the selection criteria are the same. With SRR, for example, a user can generate a family of three reports, one listing all contracts, another showing contracts of less than $100,000 and a third listing those greater than $100,000.

The reports generated by SRR include a cover sheet identifying the retrieval criteria, body pages listing whatever data base members meet the requirements and a summary page telling such things as how many "hits" were made. The report can be produced in an 8- by 10.5-in. or 11- by 15-in. format, with single or double spacing, Cosmic said.

Written in Cobol, SRR has been implemented on an IBM 370/158 under OS/VS2 Release 3.7 with JES2 and utilizing approximately 392K bytes of real storage. It has also been run under OS/MVT with Hasp in about 180K bytes on an IBM 360/50.

Magnetic Tape Only

Distributed on magnetic tape only, the 5,000-source-statement program costs $610. Documentation costs an additional $16.50.

SRR is cataloged by Cosmic as HQN-10889/CW and can be ordered from 112 Barrow Hall, University of Georgia, Athens, Ga. 30602.

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Management, Maintenance Goals In Error Control Met by 'Harm'

ARLINGTON, Va.— Operations management and maintenance personnel in IBM OS and OS/VS shops can work together to identify and control hardware errors with the Hardware Reliability and Maintenance system (which has the ironic acronym Harm), according to the vendor, Tagg Associates.

The two groups often work at cross-purposes, Tagg noted, because management sees problems at a gross level, affecting system operations overall and requiring an historical profile of performance for proper analysis. The maintenance people have to meet each error as it occurs, regardless of history.

On a daily basis, Harm reads the operating system error log, which is an incident file, extracts data into its own long-term files and then examines both the daily and the historical occurrence of errors from both the unit and mounted volume point of view, Tagg explained.

A daily action list reports situations in which user-defined thresholds are exceeded and maintenance appears warranted. Since the thresholds can be changed, the size of the exception reports can — in effect — be adjusted until it reaches a size the staff can handle, a spokesman added.

History, Comparative Reports

A range of short- and long-term history and comparative reports may be generated for such purposes as measuring improvement, judging critical data set placement or comparing equipment in a multivendor installation. Users may also participate in a comparative reporting service performed by Tagg, the spokesman noted.

Written in Assembler and organized as a single-step job requiring 220K bytes of memory, Harm is available for $8,400, which includes source code and maintenance for one year.

Tagg Associates is at Suite 2017, 1022 Wilson Blvd., Arlington, Va. 22201.

MVS Installations Monitored by 'Look'

PRINCETON, N.J. — Look, the real-time measurement tool for IBM OS and OS/VS installations, has been modified to function in an MVS environment as well, according to its vendor, Applied Data Research, Inc.

Other enhancements include device allocation and control block analyses and commands with which the user can alter the job-stream after analyses.

The MVS version of the package is available under license for $6,000, the company said from Route 206 Center, Princeton, N.J. 08540.

Correction

"Users Put 38 Packages on Honor Roll" [CW, Jan. 17] inadvertently identified several of the honored packages as "first-time winners" although they had been on Datapro honor rolls previously. While they missed the list in 1975, Easytrieve and Total were both on the honor roll in both 1973 and 1974; DYL-260 and Minicomm were on the roll in 1974.

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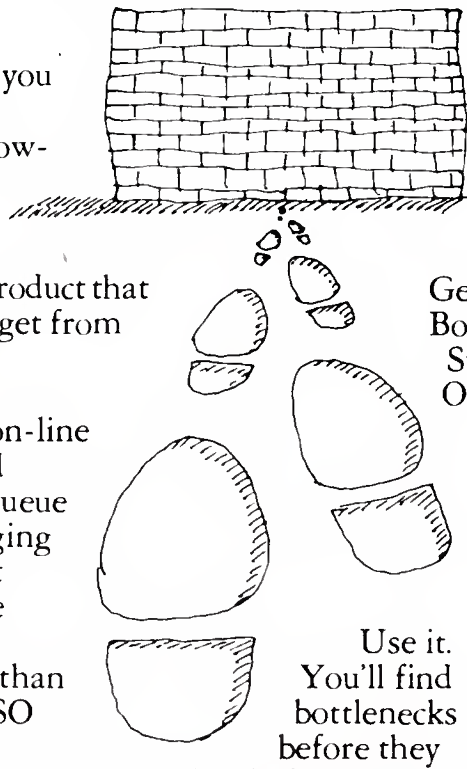

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Cullinane Data Management System 9:00-Noon

A presentation tailored to technical and management personnel on the Cullinane Data Management System (CDMS) including IDMS-DB/DC, INTEGRATED DATA DICTIONARY, ON-LINE QUERY, and the CULPRIT/EDP-AUDITOR Report Generating System. Particular emphasis will be placed on database management, competitive factors, cost justification, and user experiences.

CDMS Workshop 1:00-3:00 p.m.

Workshop session for attendees to explore how they could use CDMS with specific applications of interest to them or related technical questions in meaningful depth. These sessions will be conducted by key members of the Cullinane Corporation CDMS support staff.

EDP-AUDITOR/CULPRIT 1:00-3:00 p.m.

A separate presentation for technical and management personnel on the Cullinane Corporation family of Report Generating Systems including CULPRIT, EDP-AUDITOR, EEO-REPORTER. Particular emphasis will be placed on feature-benefit analyses, competitive factors and user experiences.

Social 3:00-4:00 p.m.

Opportunity to meet with members of the Cullinane Corporation Technical and Management Staffs in a relaxed and casual environment.

Seminar Leaders

Thomas F. Meurer—Mr. Meurer, Vice-President and Northeast Area Manager, has an extensive database administrative background, including experience with the U.S. Navy, and General Tire Company. He has been responsible for the design of databases to support accounts receivable, billing, sales history, and manufacturing applications. He is known nationally for his expertise in database principles, available systems and their applications. A gifted speaker, he is often requested to address National data processing conventions. Mr. Meurer holds a B.S. degree in electrical engineering with a minor in computer science from the University of Notre Dame.

Robert J. Davis—Mr. Davis is Central Area Manager in charge of all marketing, training, and support functions. In previous positions as Systems Engineer for IBM and General Tire, he gained extensive experience in database design and application system development. In addition, he directed the customer education and technical support functions for CINCOM Systems. Mr. Davis specializes in manufacturing-oriented applications, and is responsible for the development of the IDMS manufacturing package. He holds a B.S. degree from the University of Akron, and has taught computer science courses at that university.

James G. Blake—Mr. Blake is National Marketing Manager for the CULPRIT family of Output Processors and the IDMS-DC Teleprocessing Monitor. Prior to joining Cullinane, he was a Marketing Representative for IBM, where he was responsible for the sale, installation, customer training, and systems design assistance functions for System/3. In this capacity, Mr. Blake gained an in-depth exposure to a wide range of commercial data processing applications. He is a summa cum laude graduate of Boston College with a B.S. degree in Business Administration.

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Saves Time and Manpower

Network Use Cuts Cost of Issuing Commercial Paper

CHICAGO — International Harvester Credit Corp. (IHCC), like a number of other established large corporations, depends heavily upon the commercial paper market as a source of funds with which to do business.

"Commercial paper" refers to short-term unsecured promissory notes sold to investors on the open market.

These notes are offered daily by IHCC at yields based on current borrowing rates for the various maturities. The term of a note can range from one to 270 days.

Keeping track of from $50 million to $60 million worth of new issues a day and offsetting these against continually maturing notes and other cash requirements of the company seemed like a natural job for computer time-sharing, according to IHCC Assistant Treasurer Mark Hammond.

Over a year ago, Hammond decided to develop an on-line accounting and reporting system using the software and distribution network of Comshare, Inc.

Today, IHCC's entire commercial paper operation is automated — from the issuing and accounting for commercial paper sales and master note activity to posting transactions to individual bank accounts and monitoring compensation balances.

The system also serves a management reporting function, providing consolidated statistical reports to top management.

Timing 'Crucial'

IHCC handles the sale of its commercial paper through its headquarters here, but the notes are electronically issued and either held for safekeeping or delivered to other commercial banks by four issuing banks.

"Timing is crucial," Hammond noted."We have to know where we stand.

"If any of our major competitors makes a move in the market, particularly if it's to raise their interest rates, we have to be able to respond very quickly with a move of our own.

"Several minutes can make the difference between obtaining or not obtaining the funds we need," he said.

With its prior manual system, IHCC was acutely aware of the timing pressures which mounted as each trading day marched on," according to Hammond.

Every morning, just as it does now, the company would survey the market, post its rates and wait for the trading to begin. But the process became laborious as calls flooded in from bank money centers and institutional investors.

The orders were taken personally over the phone by a battery of sales personnel then set aside in written form.

When enough orders had accumulated, the issuing banks were called and the orders verbally recommunicated over the phone. Personnel at the issuing banks verified the calculations and maturity dates and hand-typed the paper notes.

The bank staff then supervised dissemination of the notes to the safekeeping banks. As many as 100 or more transactions were required to be authorized, documented and transmitted within the early afternoon deadlines.

Faster, More Accurate Method

With the time-shared system, the order information is typed by IHCC directly into Comshare's computer, which prompts the user for all pertinent data.

The data is held until the issuing banks in New York, Los Angeles and Chicago are notified by phone to access the computer from their remote time-sharing terminal.

At that point, all the information items are printed, complete with particulars concerning amounts, settlement, maturity and delivery instructions.

The system is not only faster, it assures far greater accuracy in the issuance of commercial paper by eliminating the need to perform several iterations of the data by hand, Hammond said.

Summary Reports

After the trading day comes to a close, IHCC's system automatically summarizes the day's transactions and posts these to individual bank accounts as well as to the proper general ledger accounts.

Summary managerial reports are produced daily from the ever changing data base to keep management abreast of cost and sales trends.

IHCC's four issuing banks can also access the system for summary reports of the transactions for each of their accounts, thereby providing a cross-check of the accuracy of the reported amounts.

IHCC's system includes about 15 Fortran programs and 30 subroutines which manipulate the data base and produce the reports.

On an average the system handles approximately 8,000 transactions per month. These are summarized monthly and grouped by accounting code to produce a simple general ledger report.

By month's end, the system will contain as many as 3,800 detailed records of all acquisitions and maturities. These records are purged once a month, leaving only the records of commercial paper notes outstanding from which the next month's accounting begins.

An historical file containing all transaction data is stored on tape and saved for future statistical analysis.

Four Months to Build

The basic system took approximately four months to develop at an initial cost of about $7,000.

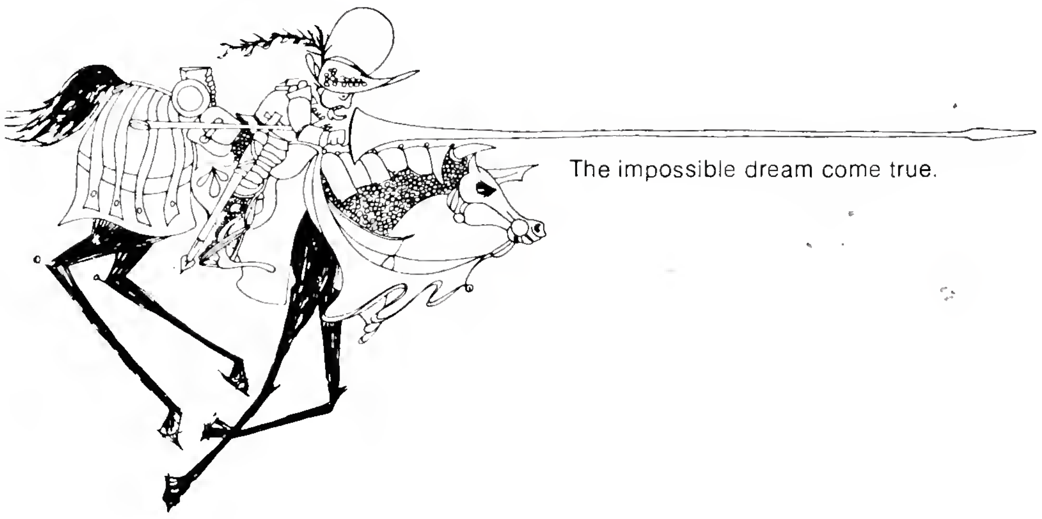
"We had discussed the system with Comshare for several months before obtaining final approval to go ahead. Once we said we'd do it, we did it, and with very few problems," Hammond said.

Morgan Guaranty, the issuing bank in New York, told Hammond IHCC's system had been brought up to full function faster than any they had seen, he claimed.

"Our issuing banks are obviously very happy with the fact that we now issue electronically," Hammond continued. "They had the same burdens we had with the manual approach in terms of manpower and time constraints.

"With their remote issuing terminals, they are saved an incalculable amount of work and, because of this, they give IHCC a significant cost break on issuing charges.

"We've more than halved our issuing costs because of the new system," he added.



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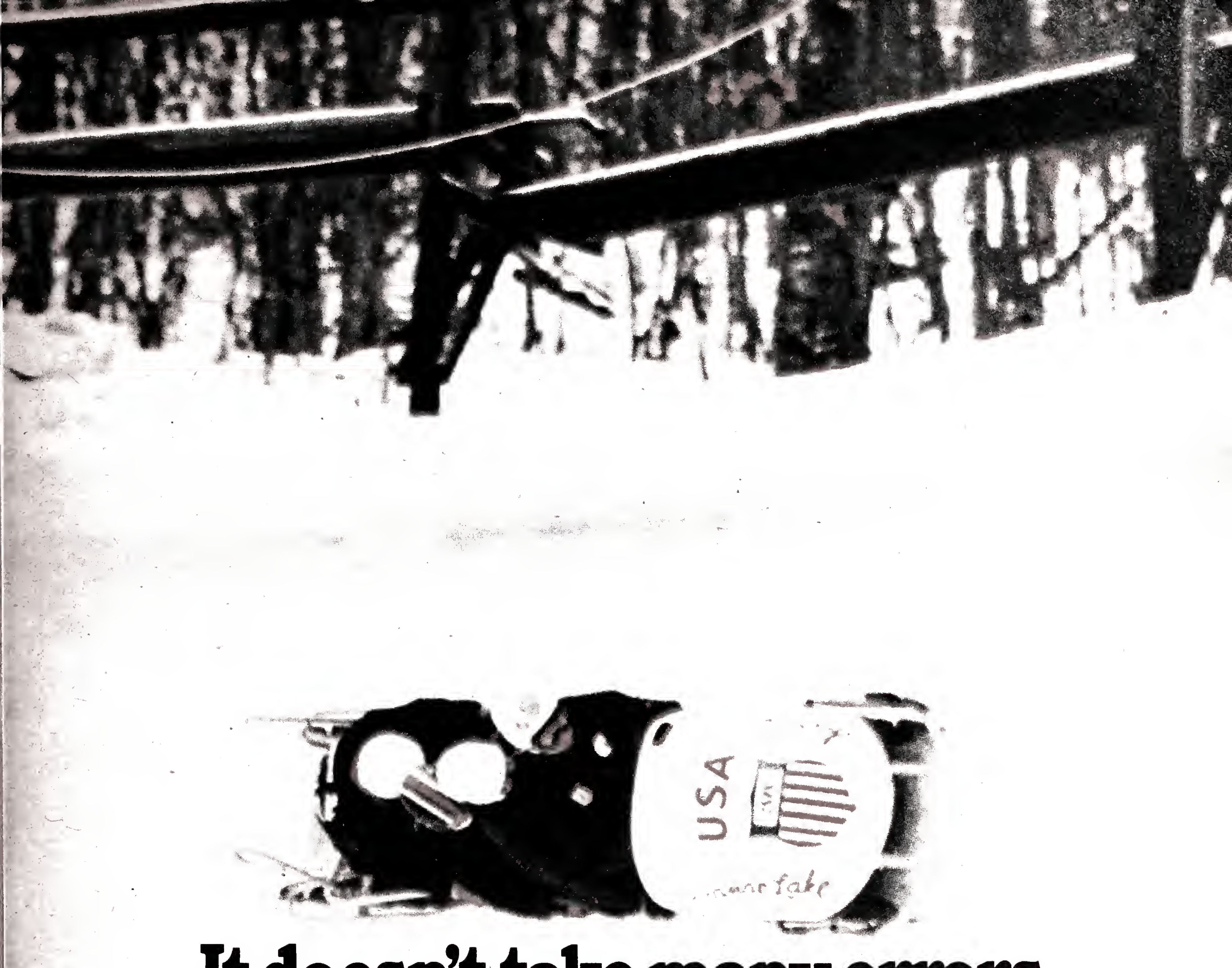

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'Adas' Backs DOS, DOS/VS User With Dynamic Disk Allocations

BROOKFIELD, Conn.— The Automatic Disk Allocation System (Adas) from Universal Software, Inc. (USI) is said to save disk space and improve multiprogramming flexibility for IBM DOS and DOS/VS sites by dynamically allocating file space from unused areas on disk.

Adas allows the sharing of disk areas between partitions, eliminating the need for separate work areas for each partition as required by IBM's logic, USI said.

Adas further conserves space by deleting expired files and truncating unused space after a file has been created, a spokesman added.

The package provides allocation of a number of file types on a variety of disk devices. Sequential, Indexed Sequential (Isam) and Direct Access files may be organized on IBM 2311, 2314, 3330 or 3340 devices and fall under Adas control, he noted.

An automatic file protection feature reportedly prevents the overlapping and deletion of unexpired files while a secondary file allocation facility finds space and avoids job cancellations that might otherwise occur if the original Extents were surpassed, USI said.

JCL Independency

Other Adas features include an Automatic Volume Recognition (AVR) capability which makes the user JCL-independent. A disk pack may be mounted on any available spindle without changing JCL or causing operator interventions; the system finds the pack and the file wherever it is, the spokesman explained.

Presumably of use for either system balancing or customer billing purposes, a file usage accounting facility is provided which generates reports reflecting when and where each file was used.

Adas does not require modification of either user application programs or IBM operating system code, USI said. The package is available at $2,800 for a two-year license or at $140/mo on a rental arrangement, the firm added from Brookfield Office Park, Rt. 7, Brookfield, Conn. 06804.

File Analysis Added to 'DAS'

ARLINGTON, Va. — The Data Administration System (DAS) from Psi-Tran Corp., introduced a year ago for large-scale IBM systems, has been enhanced by the addition of a file analysis report, according to the vendor.

DAS was designed to provide a means of determining the total use of any data element within a file or across a system or subsystem of Cobol programs. It works from the user's source programs and JCL statements to generate reports of what data is used.

The newly developed file analysis recognizes that the same physical file — and fields within the file — may be used in various ways and under various data names by different programs within the same installation, the vendor said.

The report summarizes all names used and attributes assigned to each data field that can be identified by its physical location in a file, Psi-Tran explained. "Attributes" include the item's PICTURE as well as any Clauses or Usages included in its definition, a spokesman added.

The report also shows, in a matrix format, how each program used the data element with which it worked. This portion of the analysis would show when the element value was set, when the data was used and when the value was tested as a key to possible action.

Since all three actions might be taken in a single program, the matrix is useful in highlighting such multiple processes, according to the spokesman. A different format might, for example, list the actions separately and leave the programmer unaware if he happened to miss a reference, he noted.

Other reports, retained from the original DAS, include an analysis report which documents the use of all COPY files, records and procedures; a linkage analysis showing interrelationships of program modules; and a data set analysis which lists such things as data set names from JCL and all programs that use the data set.

DAS functions under IBM OS, VS and MVS environments and costs $8,000, Psi-Tran said from 1401 Wilson Blvd. (P.O. Box 9467), Arlington, Va. 22209.

Citibank Offers Service To Users in N.Y., N.J.

NEW YORK — Claiming rates lower than other remote-computing vendors because service will be based on a Digital Equipment Corp. Decsystem-20, Citibank's Interactive Computer Center is now offering time-sharing for users in the New York-New Jersey metropolitan area.

The center supports APL, Assembly, Basic, Cobol and Fortran facilities. Users can access the system through terminals with transmission speeds up to 30 char./sec, a spokesman said.

Financial application programs and a network capability are under development.

Citibank's center can be reached at 399 Park Ave., New York, N.Y. 10022.

'Datamacs' Updated To Handle Live Data

VALLEY FORGE, Pa. — A file processor option for the Datamacs test data generator from Management and Computer Services, Inc. (Macs) enables users to extract records from an existing file on a conditional basis and alter the data through the package's other features, the vendor said.

Datamacs was designed primarily for testing Cobol programs with files created according to specifications set up by the programmer. Normally the generator reads a Cobol source program that includes control cards interspersed in the Environment and Data divisions.

It builds the files based on the user parameter entries, then transfers control to the Cobol compiler for object code generation and execution. The test files are written under standard IBM access methods, Macs noted.

The generator can be used with other languages through use of Cobol-like Environment and Data division skeletons and the Datamacs control entries. There is, however, no "automatic" switch to compilation and execution with these other languages, Macs said.

The file processor option allows users to create new test data files in the conventional way — based on the Cobol program's file descriptions — and to build a completely new file by "stripping" records from an existing file in one execution of Datamacs, according to a spokesman.

The option can be added to any Datamacs site that is under a current maintenance agreement or included in new acquisitions of the base package.

Datamacs operates under IBM DOS, OS and their VS equivalents. The package can be purchased for $8,500 (OS) or $6,500 (DOS); the file processor is available at an introductory additional cost of $1,500 during January and February.

After that the cost of the option will be $2,500, Macs said from 790 Valley Forge Plaza, Valley Forge, Pa. 19482.

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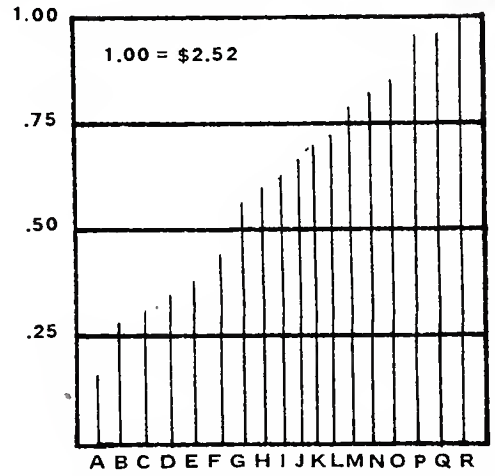

* indicates two services

The above program solved a system of linear equations and was run in three core sizes. The results are contained in:

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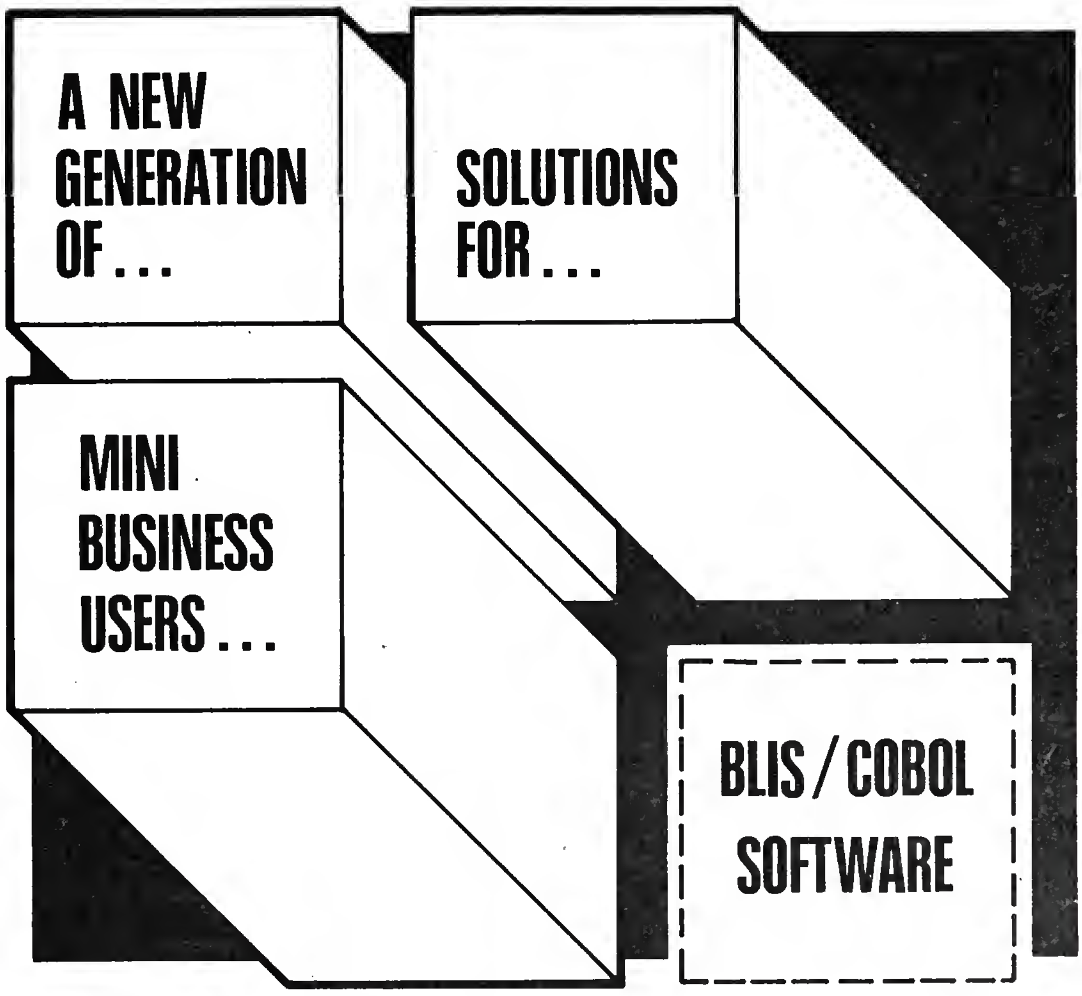
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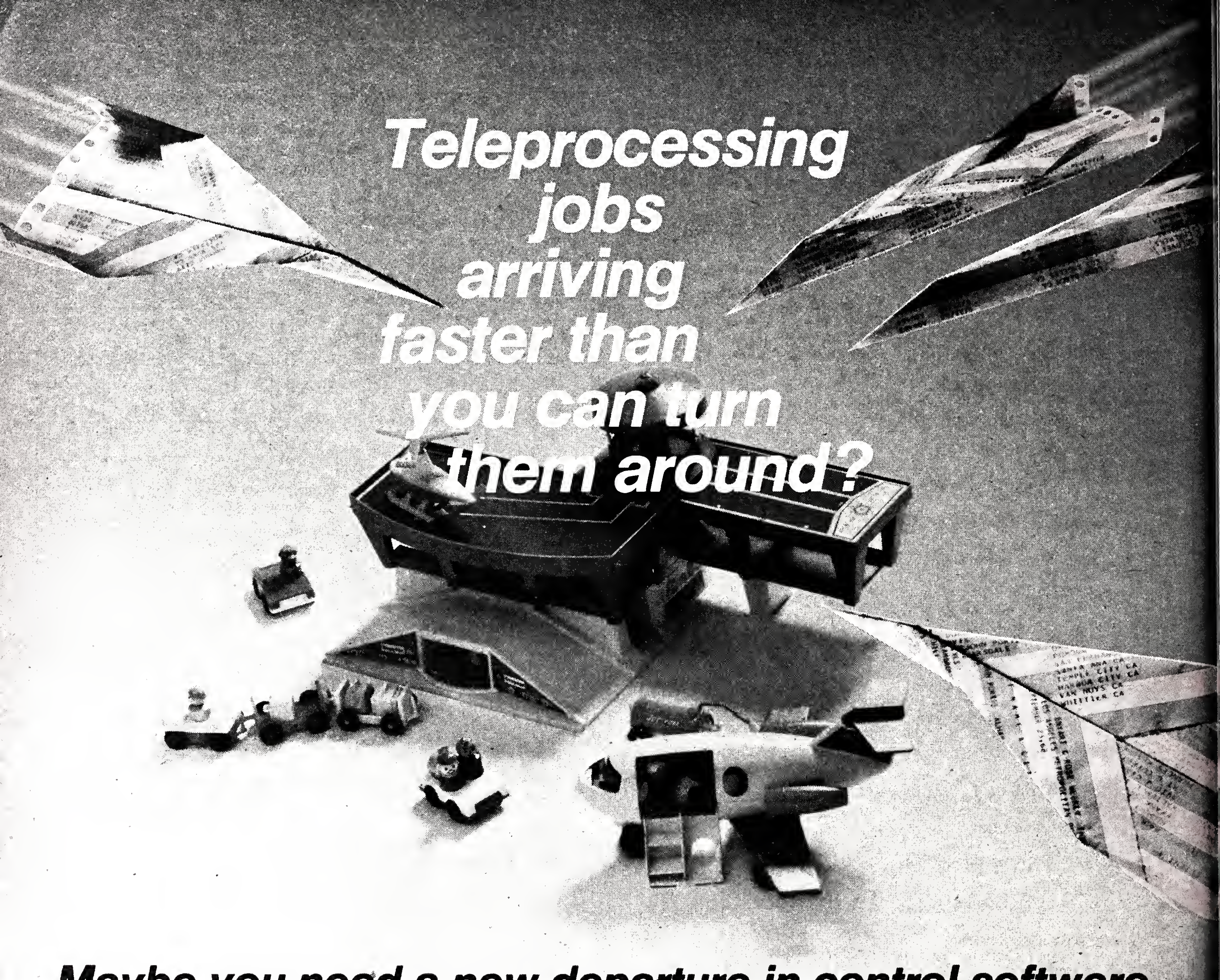

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Independent CRTs to Replace Dataspeeds in Police Net

By Ronald A. Frank
Of the CW Staff

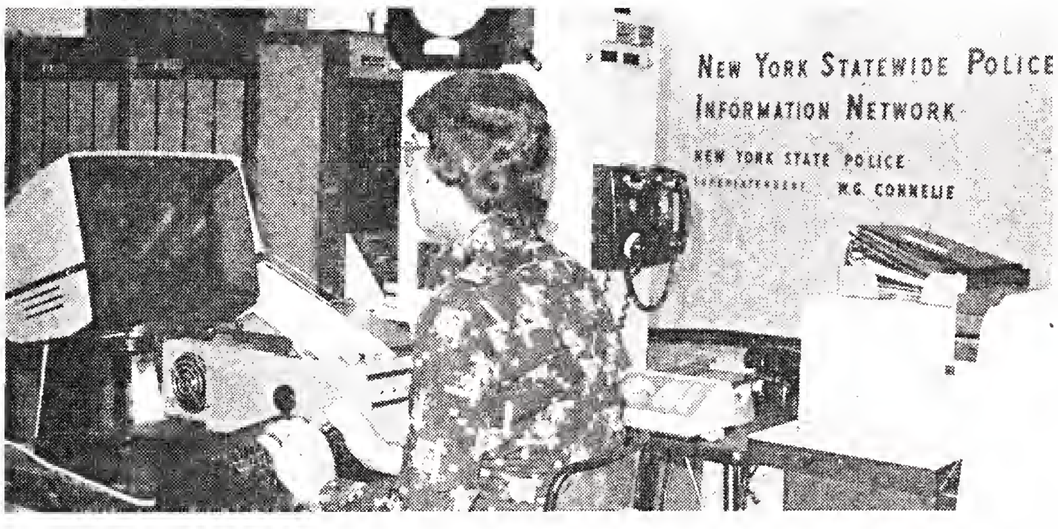
ALBANY, N.Y. — The New York State Police has decided to use CRT terminals from International Communications Corp. (ICC) in its statewide motor vehicle and criminal justice network.

By May, the ICC 40+ terminals will replace 330 Bell System Dataspeed 40 CRTs which the state police have operated for several years. The 40+ will require almost no retraining of terminal operators since it is essentially a direct replacement for the Dataspeed terminals supplied by New York Telephone Co., according to Warren B. Surdam, deputy superintendent.

This is the second known incidence of a user replacing AT&T Dataspeed terminals with an independent's devices since the beginning of the year [CW, Jan. 17].

CW Photos by R. Frank

Staff Seargeant Richard J. Martino processes a motor vehicle inquiry on an ICC 40+ at state police headquarters in Albany, N.Y.



William Shaw, senior computer operator, checks some software in the Nyspin DP center. In the background is one of the dual Univac Series 70/6 CPUs which handles the law enforcement data base.

The ICC terminals will save the state police about $100/mo per terminal, but Surdam would not specify the exact cost because the state police is currently involved in a legal proceeding with New York Telephone Co.

It is believed the state police began to look for replacement terminals after New York Telephone raised its intrastate rates for the Dataspeed 40. The rate increase was a result of an earlier study by the New York Public Service Commission (PSC) which found New York Telephone was not charging high enough rates for terminal equipment.

The study said the phone company was subsidizing the cost of terminal equipment and services with revenue from other services. As a result, it ordered New York Telephone to increase its rates.

New York Telephone raised rates on the Dataspeed 40 Model 2 about 25% in November 1975 and raised them again in August 1976. The net effect to intrastate users is that the Bell terminal now costs 30% more than before the PSC study, according to a spokesman on the commission staff.

Because of this increase in rates, many Dataspeed users in New York are now being forced to consider alternative equipment from non-Bell suppliers, according to an industry source.

Additional Benefits

The 40+ will provide some additional editing features not available on the Dataspeed units, Surdam said. By May the net will include 330 of the ICC CRTs operating at state police sites at various locations in New York.

Called the New York State Police Information Network (Nyspin), the network is used for motor vehicle and other law enforcement applications. The hub of the net is here in Albany, where a records data base is maintained on dual Univac Series 70/6 CPUs.

Last year, the Nyspin network handled more than 1.3 million inquiries. Of these, 274,000 were switched, meaning they involved some type of CPU inquiry, according to Staff Sergeant Richard J. Martino.

Uptime on the private-line, full-duplex net averages more than 98%, he added.

Before switching to the Dataspeed 40 Model 2 terminals ,the state police used Teletype Model 28KSRs. With the increased throughput of the CRTs, which also have hard-copy printers at most locations, it was found about 16 Teletypes could be replaced with three CRTs given a constant throughput, Surdam said.

In addition to checks of motor vehicle records, the Nyspin system can handle stolen articles, boats, firearms, securities, wanted persons and criminal history data. The Albany headquarters site is connected online to the National Law Enforcement Telecommunications System in Phoenix and the National Crime Information Center in Washington, D.C.

In addition, there are direct links with other states that have motor vehicle and other law enforcement data bases.

In switching to the ICC terminals, the state police kept the Bell modems which were already installed. Most of the line facilities in the statewide net are provided by New York Telephone except in areas served by independent phone companies, such as Rochester Telephone Co.

Canadian Defense Net Using Interdata Minis As 370 Front-Ends

OTTAWA — Replacing front-end communications processors with minicomputers has resulted in "substantial savings" for Canada's Department of National Defense, according to a spokesman here.

Three Interdata, Inc. 7/32 minicomputers were installed as front ends on the IBM 370/168s located at the principal Canadian Forces Data Centres in eastern and central Ontario. The minis replaced IBM 2703 communications controllers.

The Eastern Ontario Data Centre is primarily responsible for operating the Canadian Forces Supply System (CFSS), an online management information and inventory control system.

The Central Ontario Data Centre is engaged in program development and non-CFSS applications. It is also equipped to run the CFSS if there is a severe failure at the eastern center, according to the spokesman.

There are about 380 terminals on-line to the supply system, mainly custom-builtIBM 5953 programmable devices, he said.

The terminal configurations vary according to their location and function, but all configurations have a keyboard; 15.5- or 66 char./sec printer; 22 char./min, 96-column card reader/punch; a 2,400 bit/sec leased line synchronous adapter; and a 1,200

(Continued on Page 30)

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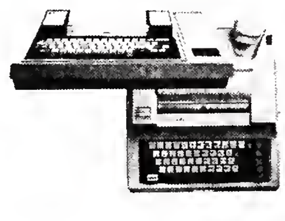

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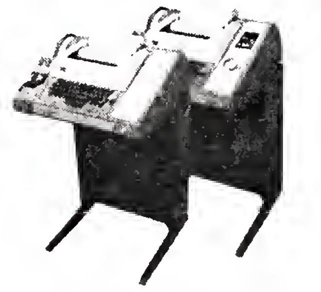

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On-Line System Benefits Highway Budget Management

RALEIGH, N.C. — North Carolina's Division of Highways has reduced the turnaround time for providing up-to-date budget information to field managers from 40 days to seven with an on-line terminal system.

The state's Department of Transportation (DOT) developed the on-line system to help its field operations managers cope with their individual projects more efficiently.

An IBM 370/158 CPU is connected to Sycor, Inc. Model 250 CRTs located at the state's 47 district and division offices by 2,400 bit/sec.

The system's efficiency allows managers to have better control over their budgets and, because data can be edited at the source, better control over the data, according to Laeron Roberts, DP director for DOT.

The system works with 14 data entry people instead of the 28 it used to take to prepare the data. It also has eliminated the voluminous error listings that existed under the old batch system.

"What used to happen," Roberts said, "was that some managers would be chronically over their budget and some severely under budget — all because they did not know how much they were spending on a project until some six weeks after they had submitted their cost data — and then they would have to scramble to get back on budget."

Since the state cannot, by law, exceed its budget, it was always a potential problem area, he indicated.

Old System

Under the old system, district managers would fill out documents containing all project activity expenditures in detail — including labor, materials and rental equipment from the state's central pool — which were expenses against appropriate work orders.

The information was then sent from the state's 47 district and division offices to Raleigh for collection and keypunching. By the time the data was put into computer-readable form, corrected and processed, as many as 40 days had elapsed.

When a project manager wanted to know the budget status of his project, he either had to go through mounds of his own paperwork or wait until the computerized information was available, according to Roberts.

Two Problems

"We were really looking at two problems," Roberts recalled.

"First, we had to relieve the manager of much of the detail that he was required to put into his reports.

"Then we had to devise a system for getting his reporting swiftly and accurately to the computer for processing and returning the information in a like manner to him," he said.

The first part of the problem was solved by designing a standardized cost accounting system which meant that project managers would only have to enter summary data into the system, instead of twice the amount of data under the detail system.

"For the second part of the problem," Roberts said, "we wanted an IBM 3270 CRT or compatible unit for data entry as well as inquiry/response applications to run on our 370/158 under CICS."

"With the Sycor 250, we got plug-to-plug compatibility with the IBM 3275 terminal we had been using in testing. It had identical logic, no changes were needed in coding, and it was 30% lower in price than the comparable IBM units," he recalled.

Data Entered Daily

Now the data is entered daily from the 47 terminals located in all of the highway's division and district offices.

The mainframe's program performs immediate range checks, table comparisons and other editing functions before the data is transmitted to the division's headquarters here, Roberts said.

At the end of each two-week period, all project and cost data that has been entered is compiled and processed. During the following week, field managers can access the central data bank and know exactly where they stand, he noted.

Canadian Defense Net Using Interdata Minis As 370 Front-Ends

(Continued from Page 29)

bit/sec dial line adapter.

Other supply system terminals are IBM 3s and 2770s. The IBM 3s are located at supply depots where higher volume printed output is a necessity, the spokesman explained.

The supply system terminals are located coast-to-coast in Canada and in Germany. At each center, the Interdata 7/32s support the supply system terminals, which are multidropped onto leased lines running at 2,400 bit/sec.

In addition, there are 4,800- and 9,600 bit/sec leased lines for program development applications, asynchronous low-speed lines for consoles and four dial ports, according to the spokesman.

Running Since April

The 7/32 front-end system became operational last April running an Interdata-supplied 270X emulator. Enhancements have since been made to extend the emulator's functions and a Network Management System has been incorporated, he said.

The Network Management System provides on-line reporting and logging of line status and error rates. It also includes a message-switching function allowing messages to be sent to terminals from the front end even when the host CPU is down, he added.

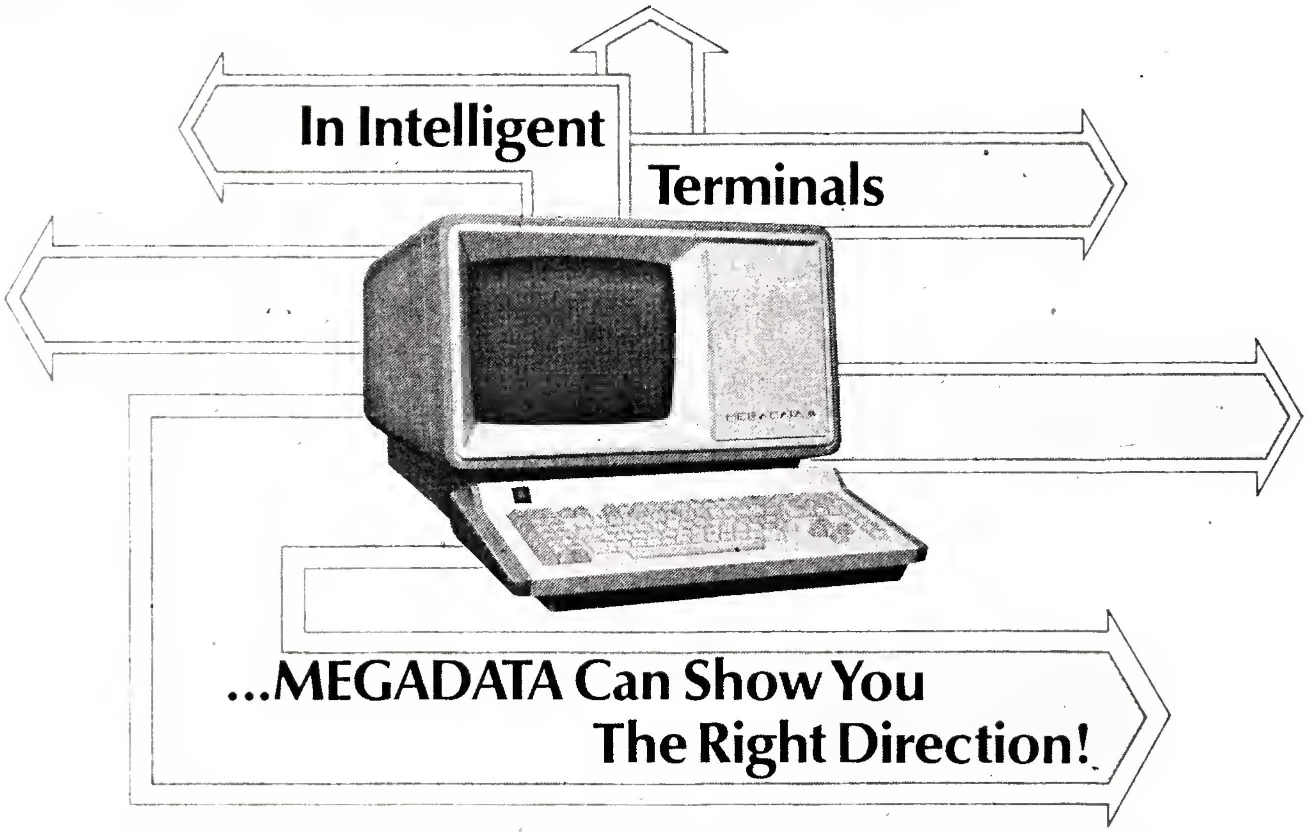
The entire emulator and Network Management System runs in 64K bytes of memory, the government spokesman noted.

Teletypewriter Features International Compatibility

IRVING, Texas — Vardon and Associates, Inc. has introduced an international teletypewriter terminal featuring two-color printing, keyboard and international Telex compatibility.

The Universal International Telex is priced at $1,799 and can be rented for $69.50/mo with service or $59.50 without service.

Vardon is located at 930 N. Beltline Road, Irving, Texas 75061.



If a profusion of claims has you confused about the right terminal for your application and budget, MEGADATA will provide the right answers . . . in applications and in cost savings. Our terminals range from the full-scale System 700 to the low-price System MC77. Both families of terminals contain a 12-bit LSI microprocessor, an extensive keyboard with a large number of function keys, and a bright easily readable display. . . . And our software can communicate with almost all sophisticated computers in any format, protocol, line discipline, and speed.

Our customers have achieved economies up to 35 percent in operations with MEDAGATA terminals. But claims are easy to make, so let's look at some of the details.

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      - Transmission Rates from 50 to 38.4 Kilobaud Serial, 10,000 Characters Parallel

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DP Dialogue

Notes and observations from IBM which may prove of interest to data processing professionals.

Computer-controlled electric vehicle moves automatically to the selected aisle and bin, for storage and retrieval of goods in a main warehouse of VWR Scientific.

CICS/VS Helps Multiply Profits at VWR

"Controlling operations with an online system helped us multiply profit severalfold," says James W. Bernard, president of VWR Scientific Inc., one of the country's largest distributors of scientific and photographic supplies and equipment.

Over two years, he notes, the San Francisco headquartered company was able to decrease inventory while improving service levels and cutting operating costs.

"Distribution is the science of customer order and materials handling," says Bernard. "With 48,000 line items in our catalogue, maintaining service levels without excessive inventory is no mean feat—and in this business making a profit means staying lean."

At VWR, the computer handles each major operating function: processing customer orders, directing warehouse operations to pick orders and store incoming merchandise, managing inventory, and generating purchase orders. The company, a subsidiary of Univar Corp., uses 110 IBM 3277 Display Stations in a nationwide network based on the Customer Information Control System/Virtual Storage (CICS/VS) running on a System/370 Model 158.

Sales people use online inquiries to give customers immediate answers on item availability, order status or prices. Customer orders are entered directly at the terminals to provide rapid turnaround.

To store and retrieve goods in a main warehouse, computer-generated punched cards control electric vehicles which move automatically to the selected aisle and storage bin.

The capture of transaction data during terminal procedures has reduced data preparation costs as well as most sources of data error. Incoming inventory is entered into the system sooner and becomes available sooner.

According to Lester Gray, vice president of management information and computer services, the rapid implementation of the new and enhanced systems would have been more difficult, and many of its most valuable features would not have been feasible, without CICS/VS, an IBM program which manages terminal transactions and file accesses in online systems. "The flexibility and device independence of CICS lets us add sites, add new types of terminal inquiry, and introduce major system enhancements quickly and easily, without disruptions," he says.

"CICS enabled us to include some special features," Gray adds, "including online inquiry access to our backorder system which automatically releases merchandise for delivery as it is received. The system makes provisions for expediting customer orders or handling emergency orders.

"Our applications include a marketing information system which scans our files and produces reports of activity organized by customer, product, vendor or geographic area. This has helped us to identify obsolete items and to supply valuable information to our customers, vendors and operating people.

"We use the system to compile the data for our quarterly price book directly from the price files.

"An important thought behind our 1975 acquisition of Treck PhotoGraphic Inc., a $90 million nationwide distributor of photographic supplies and equipment, was that we could support 32 new locations and Treck's product line with our existing CICS system.

"With the flexibility and modularity of CICS, we were able to add Treck to our online system easily," Gray reports. "Without CICS, integrating Treck would have been very costly and absorbed our developmental resources for a long period of time."

IMS/VS Helps Tires Roll at Firestone

"During the last six years, Firestone has reduced overall costs for warehousing and shipping, transportation and inventory by 10% below what they would have been without the innovations opened up by our information system," says Paul Heise, director of inventory management.

Firestone Tire and Rubber Company began developing its Firestone Inventory Management System (FIMS) in 1968. Four years later it started converting to Information Management System/Virtual Storage (IMS/VS), in order to integrate all subsystems through a common data base.

Today, FIMS is an online system that responds to inquiries and transaction entries from any of 400 IBM 3277 Display Stations in Firestone's nationwide network of sales offices and warehouses. It supports customer order processing, production scheduling, inventory management, warehouse operations, and physical distribution.

Salespeople use terminals to enter customer orders or obtain complete order status information. The system continuously monitors inventory and customer orders, and provides production schedules to tire-making plants. It monitors production, keeping track of tires built to 6,000 different specifications and adding newly made tires to inventory each day. And it schedules the distribution of tires, including warehousing and the loading and routing of trucks.

"With FIMS, we've been able to respond faster to customers' needs while reducing inventory," Heise notes. "It has permitted us to regionalize our distribution system, reducing 45 warehouses to 22 high-volume distribution centers."

The FIMS online computer system allowed Firestone to improve customer service while cutting back from 45 warehouses to 22 facilities like this modern Cranbury (N.J.) Distribution Center.

"Under IMS/VS the data base used for order entry is the same one that deploys inventory and schedules production," notes W. L. Smith, assistant controller and director of data processing. "This has enabled us to add some valuable new functions to the system.

"For example," he continues, "the computer organizes orders so that a load for a specific truck or delivery run is all drawn out at one time. We can sort and batch orders from one customer or one geographical region to insure that only full trucks go out, with deliveries grouped by area. We can automatically handle special instructions, such as orders dated for future delivery or specified for a certain day of the week."

While most of FIMS processes current transactions, one subsystem analyzes historical data. "The IMS/VS data base enabled us to develop the Inventory and Distribution Research subsystem," Smith notes, "which analyzes historical patterns in our tire operations."

"This kind of research is vital to our inventory management people," Heise adds. "It helps them select sites for regional warehouses and plan the details of our physical distribution system."

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Nebraska corn grower Kenneth Bruns takes a reading of soil moisture, one of the variables considered by Agnet in the calculation of an optimum irrigation schedule.

Serving the Farmer in the Field

Nebraska farmers are conserving water and cutting the costs of feed and energy with the help of Agnet, an agricultural network developed at the University of Nebraska.

"Our controlling idea in designing the system," says Thomas L. Thompson, professor of agricultural engineering at the university, "was to eliminate the need for any special user training, yet still have a sophisticated interactive system."

Thompson is co-developer of Agnet at the Institute of Agriculture and Natural Resources on the university's Lincoln campus.

After two years, farmers are attributing significant savings in feed costs, water and energy to the system, which offers more than 100 different applications and is based on an IBM System/370 Model 158 at the Nebraska State Department of Administrative Services.

To use Agnet, the farmer or county agent enters the details of the problem at a terminal in a county agent's office, a district station or at the university.

Says James G. Kendrick, professor of agriculture economics and the other co-developer of Agnet: "The user signs on by keying in one word, the name of the desired service such as 'Beef' for a cattle performance simulator or 'Dry' for a simulator of grain-drying systems.

"The computer takes it from there, guiding him through a session. It begins by asking for parameter values: type of drying equipment, capacities, fuel costs and the like. It displays a menu for selection of qualitative parameters such as crossflow or counterflow dryer. For numerical parameters, it asks the user to key in a value. Or the user may enter a zero and the computer will insert a default value from updated agricultural statistics.

"If the user doesn't understand a request, he keys in 'Help'," Kendrick notes. "The computer then displays an explanation of the question and of the significance of each possible answer."

Farmers are using Agnet to perform such calculations as irrigation schedules based on soil moisture and crop data, minimum-cost feed mixes, crop-drying schedules, financial analyses of capital investment or crop commitments, soil analyses, pest control and fertilizing schedules and many others.

Computer Supports Hospital Patient Care

When a nurse anywhere in Harris Hospital wants to order a test, medication, or X-rays for a patient, she steps up to one of 102 terminals in nursing stations and other operating areas of the 628-bed Fort Worth, Texas, hospital and keys in the patient's name and indicates to a computer the service she requires.

Much of the actual operation of the hospital—patient care and administrative work—is accomplished through the computer. A realtime medical information system accepts the order and forwards it to the laboratory or other service department. The computer adds currently applicable details of the procedures to orders for tests or X-rays. When the results are available, the system returns them to the requesting station.

Users Enter Data

"The users do all of our data entry at terminals," says Herbert A. Witt, director of data processing. "By leaving control of information and responsibility for its accuracy with the user, we eliminate most sources of data error."

In the laboratory, for example, the response of the computer to requests for service is controlled by the pathologists; they enter the test parameters as data. "What our programmers have supplied is a completely generalized structure for a laboratory test procedure. The pathologists specify each step of the test, and such parameters as the normal range of each test variable."

User confidence, says Witt, is essential to successful implementation of a system like this. "You can do so much more for your users after they've learned to trust you, to be receptive and to work with you."

"You have to earn that confidence," says Michael Herrmann, assistant director of data processing. "It's a self-reinforcing process: the more user confidence we have, the more we can do for our users.

"We try to avoid urging on them ready-made solutions which they have had no part in specifying. And we stay in touch during the development process, getting their help and approval on details of the system performance. This gives them a sense of identification with the system and a readiness to help make it work."

"Our emphasis has been on performing patient care, as distinct from recording and reporting after the fact," Witt says. "The main purpose of the system is to relieve doctors and nurses of paperwork."

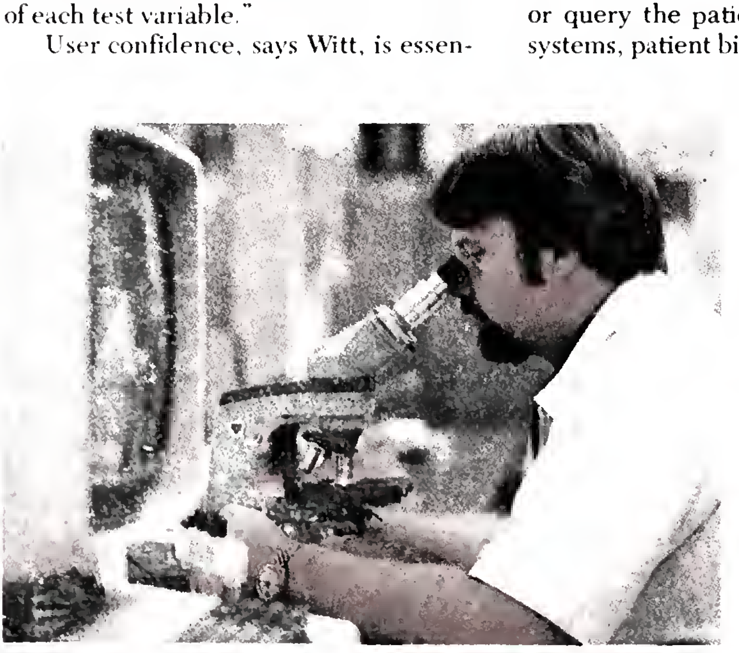
As with laboratory tests, Witt explains, authorized users can also enter, through a 3277 Display Station, orders for medication, X-ray procedures and other patient care services.

Query Patient's Program

An authorized user at any terminal can determine a patient's medication program or other medical information, or query the patient census, inventory systems, patient billing or payroll system.

Administrative people perform many of their duties through the computer, including management of bed assignments and calculation of insurance benefits. There is a patient billing system, one for purchasing and inventory, and a payroll system.

Admissions personnel, pharmacists, administrators and other users interact via terminals with any of these systems, accessible online under Customer Information Control System/Virtual Storage (CICS/VS).



When a nurse at Harris Hospital orders a test for a patient, an online information system displays the detailed test parameters for the technician here in the laboratory. Results are reported back through the same system.

MVS Takes Over Swiftly at Fairchild

Global data processing networks—once a dream and later a daring innovation—are now basic to the operations of a number of businesses around the world. But this kind of far-flung organization demands a closely integrated information and data processing system if it is to function effectively.

One company whose manufacturing and marketing efforts span the globe—Fairchild Camera and Instrument Corporation—is establishing just such a system. Within Fairchild, a manufacturer of electronic components and systems, plants and sales offices in the U.S. and overseas are linked directly to an IBM System/370 Model 168 computer at its corporate headquarters in Mountain View, California. The company transmits complex order entry transactions and manufacturing data over a network with which it is linking nearly 100 of its locations around the world.

Early in 1976, Fairchild converted from OS/VS1 to OS/VS2 Multiple Virtual Storages (MVS). Since MVS increases the number of terminal users the system can serve, and because it maintains a predictable terminal response time during peak loads, it provides strong support for combined online and batch operations.

"Our data processing systems really drive this company," says Burleigh Cook, director of information services for Fairchild. "With worldwide operations in the balance, we wanted assurance that we could keep going when the going got tough. We achieved that reliability with the MVS operating system.

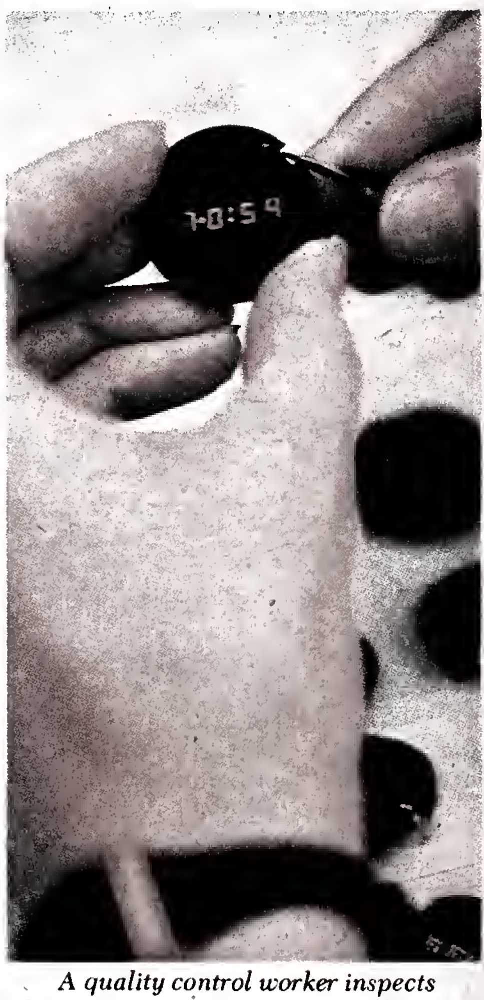
Sophisticated Error Recovery

"We are particularly impressed with the sophisticated error recovery facilities and procedures incorporated in the MVS software," continues Cook. "It has quicker capability for diagnosing problems and correcting them automatically than any operating system I know of.

"This in turn has meant higher availability, which is crucial to the development of an online system such as ours."

Fairchild and IBM completed joint planning for the move to MVS in November 1975, less than a month after the decision to convert was made. By January, two months later, the system was fully operational.

"It seemed as though we put six months' effort into those two months," says Ray Yasukochi, Fairchild manager of technical support, who was in charge of the move. "Actually, we had a highly detailed plan which we carried out 'by the numbers,' working shoulder to shoulder with IBM. It was a smooth transition with a minimum of disruption."



A quality control worker inspects the components of a digital watch, one of the high-technology products of Fairchild Camera and Instrument.

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Terminal Transactions

Eliminates Pricing Deficiencies

Mini-Driven Terminals Speed Supermarket Service

PORTLAND, Ore. — A minicomputer driving a terminal system is helping a supermarket here eliminate service and pricing deficiencies, according to John Corno of Corno & Son.

"Our problem was at the checkout counters," Corno said. "It isn't unusual for us to have 100 or more people in the store and we had space for only five counters. Most items had to be individually weighed and prices calculated.

"This slowed down service and invited human error. Also, it wasn't unusual for a sales register to be $20 out of balance following a 14-hour day, and it was very difficult to pinpoint responsibility," Corno said.

To help alleviate these problems, the firm installed four NCR 255 terminals linked to Hobart electronic scales and an NCR 726 minicomputer.

The price per pound and a two- or three-digit look-up code are displayed on each rack and barrel in the store. The firm has stayed with the "old-fashioned" way of selling goods by bulk; almost 300 of the store's items can be picked out of barrels or off the racks and purchased in bulk quantities, he explained.

When a customer brings the bulk items to the checkout stand, the items are placed on a scale while the checker keys the price look-up code. The terminal accesses the mini's memory for the price per pound and then calculates the charge for the amount purchased. This is both displayed digitally and printed on the sales receipt, Corno noted.

Cashier at Corno & Son operates terminal at checkout counter.

The minicomputer also maintains a record of the hours worked by each checker, how many items he handled during that period and the dollar value in cash, checks, coupons and food stamps. This information can be accessed in a variety of forms through the terminals.

Corno described the mini as a "valuable management tool. I can pinpoint my business periods, right down to the hour and checkout stand and schedule our fastest people there. Also it is easy to see if someone is taking too long between sales during peak periods."

The system also provides information by department, according to Ernie Corno, who runs the meat department. The information reported is used for scheduling personnel. The sales totals by department are also useful for making purchasing decisions, according to another Corno, Jimmy.

The dedicated mini also maintains a perpetual inventory for produce and bulk goods. The inventory is updated by subtracting the amounts sold and adding new purchases, although a physical inventory is taken weekly, John Corno noted.

"If there are less goods in a barrel than in the system's memory, we can pinpoint exactly how much shrinkage has occurred where and when and take appropriate precautions," he added.

John Corno (right) checks out a processor at his supermarket.

Unit Tests Data Rates Up to 55 MBit/Sec

N. BILLERICA, Mass. — Tau-Tron, Inc.'s transmission test set is a communications testing device intended for digital data rates up to 55 Mbit/sec.

The PTS-107 is said to be a complete generator, receiver and error rate measurement system designed to check data at rates from 1,000 bit/sec on communications channels, coaxial cables, optical fibers, twisted-pair wires and satellite systems.

The generator section can produce a choice of four pseudorandom code lengths from 63 bits to more than 1M bit in length or a switch-programmable fixed pattern, Tau-Tron claimed.

Zeros, errors or preamble can be inserted with the PTS-107 into the data pattern and, with an external control signal, time-division multiplexed data patterns can be simulated, the company said.

The output format can be NRZ, RZ, bipolar AMI or B3ZS/B6ZS encoded to simplify interfacing the system under test.

Options for the PTS-107, which costs $5,500, include alternate crystal frequencies, 8- or 16-bit fixed words and bipolar codings, the spokesman noted from 11 Esquire Road, N. Billerica, Mass. 01862.

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Terminal Transactions

Epic Data Introduces Programmable Collection Units

BELLEVUE, Wash. — Epic Data Corp. has introduced three programmable data collection terminals and two communications controllers for their terminal line.

The terminals and controllers, Models 1647 and 1648, respectively, are aimed at factory, library and maintenance sites, according to a spokesman.

The Model 1647-1 is an Intel 8080 microprocessor-based terminal which electrooptically reads up to 12 columns on 3-1/4-in.-wide punched badges with 80-column Ansi format, he said.

Time of day can be shown in hours and minutes on the numeric display. Five LEDs are available for prompting while user-specified legends indicate their functions.

Data is converted to Ascii format for storage in the transmit buffer for subsequent transmission via a built-in RS-232C interface and/or differential line driver interface, the spokesman noted.

The Model 1647-2 incorporates the features of the Model 1647-1 plus the ability to accept data from both punched badges and 80-column Ansi cards, he said.

It includes 20 user-defined keys for inputting variable data. Information, such as time and keyboard entries, is displayed on a 10-digit numeric display, he said.

Epic Data's Model 1647-3 combines all features of the Models 1647-1 and 1647-2; but it also has 40 user-defined keys and up to 10 LEDs for prompting, he added.

For program storage, all of the terminals have up to 2K bytes of read-only memory (ROM) and can accommodate 16K bytes, according to the company.

Any terminal can be optionally configured with a self-contained magnetic stripe reader accepting multiple formats, an external wand for optically reading or scanning a variety of bar codes and the capability to accept data directly from key station inputs, the firm said.

An additional 10-digit numeric display is available as is a 32-char. alphanumeric gas discharge display to facilitate instructions or verification of information. This option also allows interactive communication with a host computer, the spokesman added.

Other options include a twisted pair line driver, a low-speed telephone system modem, serial asynchronous and serial synchronous communication ports and expandable memories up to 16K bytes of ROM and 44K bytes of random-access memory (RAM).

Terminal Flexibility

Collected data can be entered for processing in any manner, the spokesman claimed. The terminals can be stand-alone devices with appropriate peripheral memory and control logic to collect data on cassettes, cartridges, tapes, floppy disks, paper tape or punched cards.

They also can be configured in batch-oriented systems with multiple terminals connected in single- or multiport configurations to the system control units (SCU) and can be used in on-line applications, he said.

Multiport Line Control

The Model 1648-1 SCU is also 8080-based and controls up to 30 Model 1647 terminals via one multiport line. Transaction information is stored in order of receipt, Epic Data said.

The 1648-1 employs 8K bytes of fixed or programmable ROM, the company added.

The Model 1648-2 SCU reportedly controls up to 100 Model 1647 terminals via four lines. It can assemble transactions and format data for simultaneous storage on one or two local storage devices and supports a communications link utilizing Epic Data protocol, according to the firm.

RAM Storage

All Model 1647 terminals and the 1648-1 SCU have 512 bytes and the 1648-2 has 4K bytes of RAM for data buffering during the transmitting and receiving of data and for scratch pad memory, the spokesman noted.

Up to 44K bytes of RAM can be accommodated by all of the equipment introductions, he said.

The Model 1647 terinals cost $1,455, $1,995 and $2,220 for versions 1, 2 and 3 respectively. Models 1 and 2 1648 SCUs are priced at $1,995 and $2,465 respectively.

Substantial quantity discounts are available for all of the units, he said from 12728 15th Place N.E., Bellevue, Wash.98005.

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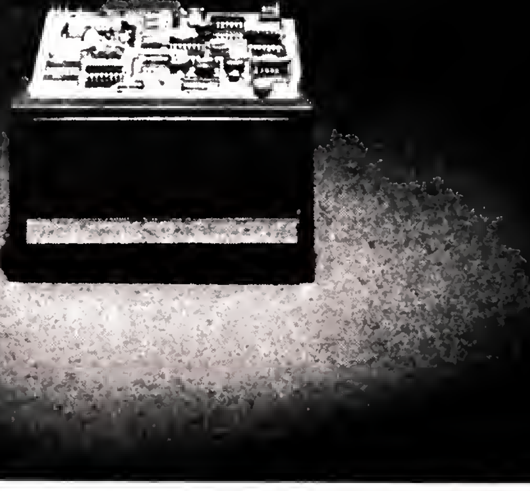

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CTC Adds Series of Data Entry Devices, Extends Interface Capabilities of KB-8

BAY SHORE, N.Y. — Custom Terminals Corp. (CTC) has added a series of data entry terminals and terminal systems to its product line and has expanded the interfacing capabilities of another terminal.

The KDC-2 is a data entry terminal and collection system with keyboard, optional display, dual data cartridge system, an Intel 4040 microprocessor and erasable programmable read-only memory (Eprom).

Its keyboard and display reportedly are user-specifiable as are the function keys on the DCS-2 dual-cartridge unit it interfaces.

Multistyle Keyboards

The KDC-2 is available with Ascii-, teletypewriter- or block-style keyboards and can also have an alphanumeric 16- or 32-char. single line display.

Terminal Transactions

The terminal system can be used as a stand-alone remote batch or distributed processing terminal and can transmit at selectable speeds from 110- to 9,600 bit/sec in Ascii or other codes, according to a spokesman.

I/O ports for RS-232 or teletypewriter-type connections to a CRT, printer or host CPU are provided with the device.

The DCS-2 has a data storage capacity of 2.5M bytes on each of the 3M Co. tape cartridges. It operates at 1,600 bit/in. and has a data transfer rate of 48K byte/sec, the company said.

Like the KDC-2 terminal, it also has an Intel Corp.4040 microprocessor and user-specifiable function keys and can transmit at 110- to 9,600 bit/sec, the spokesman said.

Both units feature variable length data records via an expandable random-access memory (RAM) buffer to 16K bytes, according to the firm.

Interfaces With Minis

CTC's TR-B is a numeric keyboard, LED display terminal which can interface with minicomputers and peripheral equipment for data collection and inquiry/response applications, the spokesman said.

Data is transmitted asynchronously to and from the terminal at 1,200 bit/sec through an RS-232 interface, although other available interfaces allow operation at speeds from 110- to 9,600 bit/sec, he said.

Options for the TR-B include a printer, cartridge or cassette storage, Intel 8080 microprocessor and an optical or magnetic-stripe badge reader, he added.

The BR-22 badge reader can read 22-column badges or 80-column cards, has RS-232 and Ascii interfaces and can have up to six LED status indicators, he said.

In addition, the company's KB-8 series of data entry terminals has been upgraded to include RS-232 and parallel interfaces for connection to most teleprinters, the spokesman noted.

The KDC-2 data entry/collection system is priced at $5,000 and the DCS-2 cartridge system is priced at $4,500. The TR-B, BR-22 and KB-8 terminals cost $1,850, $1,200 and $300, respectively.

CTC (formerly VMF Industries, Inc.) is located at 216 N. Fehr Way, Bay Shore, N.Y. 11706.

Dynatech Has Null Modem

ALEXANDRIA, Va. — Dynatech Laboratories, Inc. has introduced the Model ME-1 modem eliminator, which reportedly permits direct terminal-to-terminal or terminal-to-computer connection.

Utilization of the null modem eliminates the requirement to use two modems operating back-to-back, providing cost savings when direct connections are required, Dynatech claimed.

Signal regeneration permits extension of the 50-ft RS-232 interface limitation between equipment, the firm added.

The ME-1 provides synchronous operation in half- or full-duplex modes at selectable data rates of 1,800-, 2,000-, 2,400-, 4,800-, 7,200- and 9,600 bit/sec and 19.2 kbit/sec.

The ME-1 interface is RS-232C, CCITT V.24 or MIL-188B.

The $330 device also has front-panel LED operation status indicators and digital loopback for fault isolation, the spokesman said from the company's Cooke Engineering Division at 900 Slaters Lane, Alexandria, Va. 22314.

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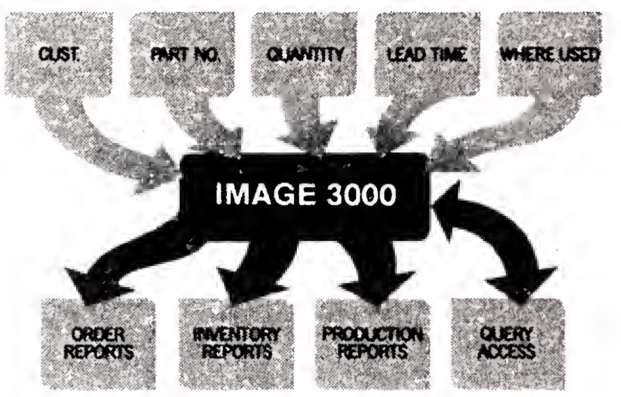

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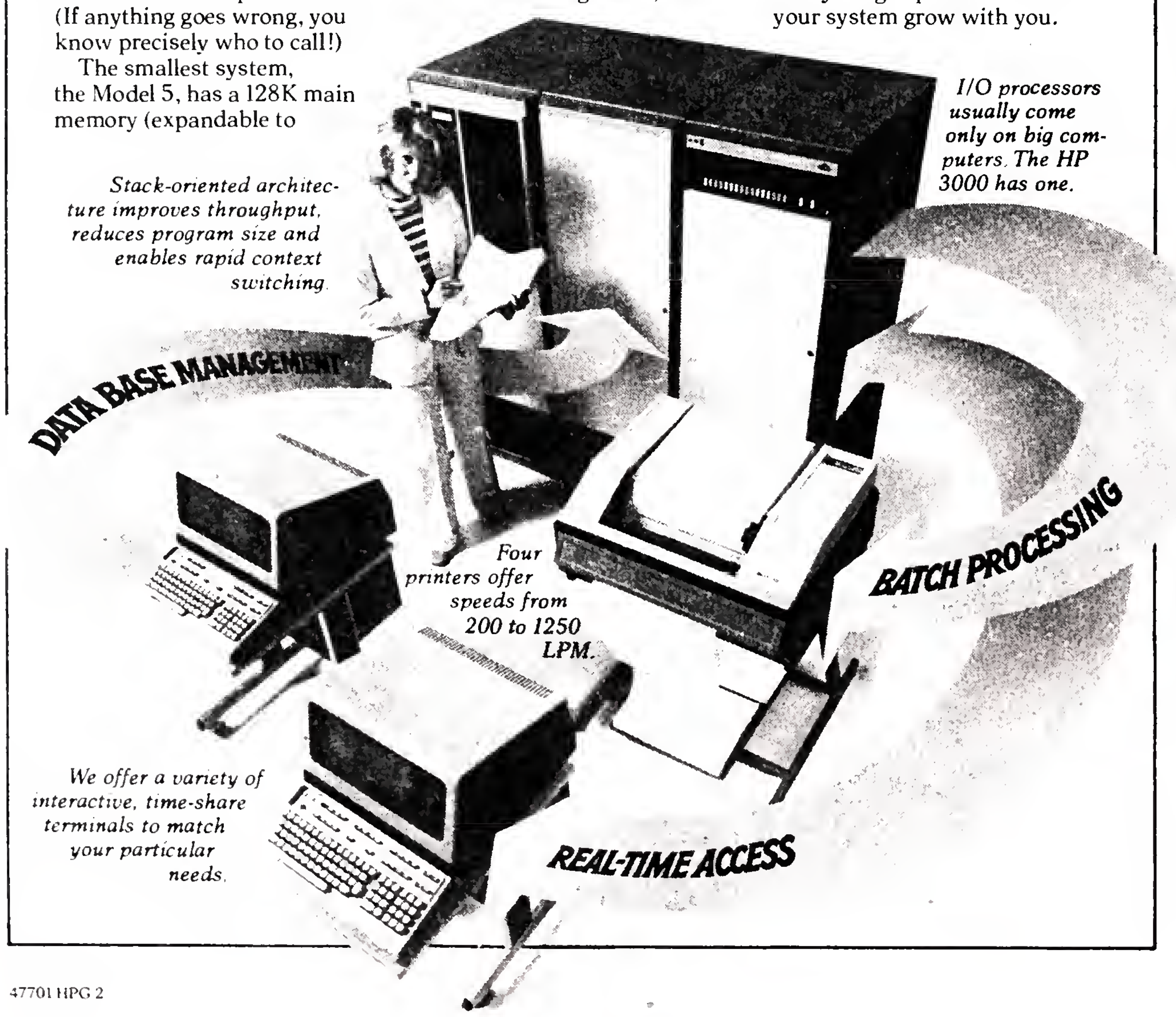

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Systems for all reasons

A Computerworld Special Report on dedicated systems ~ turnkey and otherwise

JANUARY 31, 1977

Requires Time and Money

Buying, Installing Turnkey System No Simple Task

By Gary L. Fox

Special to Computerworld

Three basic approaches have evolved from the many attempts of organizations to convert to automated systems.

Many companies purchase turnkey minicomputer systems for their relatively low cost, independence from the corporate data center and quick installation. Initially, this technique appears very desirable; the vendor supplies technically qualified personnel to install the system and train company personnel.

However, after a period of time a significant deterioration in performance may begin. Where initially most or all processes were handled by the turnkey system, necessary modifications may begin dwindling the percentage of functions handled by the system. Over time, the changes in government regulations and corporate policies can render the unaltered turnkey system useless.

Therefore, to keep the system capabilities high, the system vendor may have to remain on the scene. For a price, programs can be upgraded and additional equipment supplied to keep the system running effectively.

However, the cost of the system is continually rising. And since most turnkey system vendors are relatively small, there is always a risk that they will not be available when a modification is required.

Second Alternative

The second alternative is to design and implement the system in-house utilizing the main corporate computer and data center or contract personnel. This alternative normally offers the advantages of system control, flexibility and total customization.

Corporate people will develop exactly what management requests and modifications can be implemented as needed.

However, development of such a system is not an easy or inexpensive task. In addition to acquiring the necessary equipment to operate the system, the company must also acquire the needed technical knowledge and manpower. Also, a complicated system may take two years or more to develop and may require extensive user personnel time.

Therefore, the initial investment in a custom in-house system is relatively large compared with the turnkey system approach. However, the long-range returns resulting from flexibility and control may more than compensate for the extra investment.

The third possibility may well be considered an extension of the in-house system development approach. In this instance, a system similar to the one desired by a company is purchased from an organization which has already implemented a custom designed system. The purchased system is then learned by in-house personnel and modified to meet corporate requirements.

This approach saves much of the design and programming time required by a system developed from scratch and yet allows the organization to maintain the highly desirable benefits of control, flexibility and customization. Also, the seller will normally supply technical expertise for a predefined period of time to help the buyer learn the system.

The time required to implement this approach would probably vary from six to 12 months depending upon staff ability and resource availability. Total system cost of this technique is similar to that of the total system development described in the second approach.

No Instant System

Everyone involved must accept the fact that a purchased-base system is not usually instantly usable. The purchased system must be learned and modified, which requires considerable time from qualified data center and user department personnel.

As is normally the case, expected usable lifetime of the system will play a major role in the decision regarding which approach to take. Many other facets of company operation also affect a decision of this scope.

However, understanding the concepts set forth above will help management make the wisest decision when automating their company's procedures.

Fox is president of Fox Associates, a consulting organization specializing in custom designed systems.

'Guarded' Minis Serve Toronto Restaurant

TORONTO — A large restaurant, like any big company, might be expected to computerize its inventory, billing, payroll and other general accounting functions with few major difficulties. But the CN Tower Restaurant here, located in a radio transmitter observation/broadcast tower and serving gourmet food in a 425-seat dining room, had some special requirements as well as some unique problems.

In addition to computerizing its financial and business records, the CN Tower wanted a system to keep track of reservations and table allocations, prepare bills and balance cash registers, and monitor sales by menu item for inventory and purchasing control, according to Jean Le Blanc, general manager of the restaurant.

However, since the CN Tower is primarily a broadcasting facility, there were many technical problems that had to be overcome before the use of computers even could be considered, according to Le Blane.

Critical 'Spikes'

The most critical of these was the effect of the electromagnetic radiation found around and in the tower when the FM and TV transmitters were operating. These strong radio signals introduced "spikes" into the normal AC input of the power supplies that could destroy the computer memory unless filtered out.

CN Tower turned to two local companies, Minitech Information Services, Ltd. and Integrant, Ltd., to create a system which would meet all these requirements. The restaurant's final configuration includes two Data General Nova 2/10s with 64K bytes of memory. Each is housed in a separate cabinet with a Media III swapping core unit and a Diablo 44 disk drive with 10M bytes of storage.

The two systems, designated A and B, can be connected to a 300 line/min printer for generation of accounting reports or to two smaller units for bill printing. The systems run under the Micos operating system and all programs are written in Basic.

To eliminate the radio interference problem, Integrant installed a large voltage controlled power supply and filter system. Physically larger than the one of the computer bays, it protected all critical components against unwanted line voltage variations.

As an added precaution to prevent the intrusion of unwanted signals to the computer, all conduits for data transmission between the tower and the restaurant are shielded and grounded. All data links are also connected to modems at each terminal to eliminate impedance mismatch and phase distortion.

Special emphasis has been placed on testing of all lines from the base of the tower where the minis are located to the restaurant level. A defective transmission cable would be difficult and expensive to replace, a spokesman noted.

The system cost about $300,000; about 70% was for hardware, he added.

Reservations Top Priority

During a normal operations day, the A mini is used for reservations and table allocation, while general accounting and financial programs for the restaurant and tower administration are run on the B system. Since logging and updating reservations are the most critical operations for the restaurant, if A is down, the B mini can be switched on-line to the reservation transaction area, while the accounting programs are stored on disk until the A system is restored to operation.

Three CRT terminals mounted in contemporary style cabinets in the reception area are used by the switchboard operator to record and confirm incoming reservations and changes and to control the flow of guests to the restaurant.

Maitre D's Monitor

Three additional CRTs are located in the 1,300-foot high restaurant. The maitre d' and kitchen staff constantly monitor the system and use the terminals to enter data into the system. Slave printers, connected in parallel to the CRTs, print out bills and summary reports at the end of each shift.

For the customer the first encounter with the system comes when the prospective guest reserves his table. By keying in the proper code, the telephone operator can obtain an updated picture showing six hour segments of the day, with the bookings at all tables. Reservations can be taken for up to a year in advance. Information includes the name of the guest, date, arrival time and number in the party.

(Continued on Page S/4)

Denver Church Puts Faith in DP To Help Fulfill Basic Mission

DENVER — A turnkey system at the First Church of the Nazarene here keeps track of everything from inventory and payroll to the pastor's schedule.

The computer can even assist in sermon preparation by storing key words and phrases in a way that permits their orderly retrieval, administrator O. Wade Messer explained.

Denver's First Church of the Nazarene is the largest parish of that denomination in the world. While the stated purpose, or mission, of the church is "to confront every man, woman and child in Denver with the claims of the Gospel," the Denver First Church of the Nazarene is, nevertheless, a major business activity and could not survive for long if it were not run like one, Messer said.

When confronted by the increasing complexity of the task of keeping track of the finances, membership and activities of the parish, the church board authorized Pastor W. Donald Wellman, along with Messer and a lay member of the congregation, Lane Johnson to investigate the possibilities of using a computer.

Both Messer and Johnson were familiar with computer operations and felt a minicomputer would be ideal for their purposes. After a comprehensive investigation of available equipment, the two men decided that a unit marketed by a local firm, Computer System Dynamics of Englewood, Colo., the CSD-100, offered the best combination of capacity, performance, terminal availability and price. Messer and Johnson then worked with the vendor to develop the necessary software.

Concerts Recorded

Already included in the system are such things as contribution records, inventories of the church's properties and physical plant, payroll records and billing and accounting for receipts from the church's "Saturday Night in Denver," a series of gospel music concerts.

"What we are really excited about, though," Messer explained, "is the potential the system provides for expanding and

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On the Inside

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Mini-Based Signaling to Boost Rome Subway Safety S/4
Turnkey Way Lets Library Focus on Books, Not Bits S/5
Hospital Requires Versatile Turnkey Environment S/6

This special report was prepared under the direction of Esther Surden, Associate Editor. Cover art by Henry Fling.

Interactive Graphics System Tracks Gas Pipe Network

BROOKLYN, N.Y. — Utilities must keep close tabs on a vast network of underground gas pipes to maintain them properly. They must know exact supply conditions in the event of leaks or shutdowns, so they can adjust service to the appropriate areas.

All this requires painstakingly detailed maps that are continually updated with extensive information about the size, shape and condition of the facilities.

Brooklyn Union Gas Co. here is tackling the problem with the aid of a turnkey interactive graphics system from Calma, a manufacturer of mini-based graphic data systems.

The gas distribution company is having maps of its Staten Island service area created along with a data base, and the graphics system is designed to allow the utility to maintain and update that material.

The system is designed to help draftsmen in their mapping work. In the event of a leak or shutdown, they can ask the computer to identify the gas network sections affected, the location of the nearest cutoff valve or how many services are affected.

In turn, Brooklyn Union Gas can deploy its manpower more effectively in maintaining and repairing facilities.

The system will also aid the gas distribution utility in meeting new federal standards that require regular periodic inspection of underground facilities for corrosion control purposes. Draftsmen will be able to ask the computer which sections of pipe were inspected last.

In 1958, Brooklyn Union Gas, which serves 1.1 million customers in the New York City boroughs of Brooklyn and Queens, acquired the Staten Island territory, which now has some 70,000 services.

New York and Richmond Gas Co., which previously served that area, used nonscaled schematics and various other nonstandard recording methods to document pipe descriptions and locations. As the piping system expanded, this type of recording became unwieldy.

Three years ago, Brooklyn Union Gas contracted with Raytheon Co. to create maps of Staten Island's service area along with a digital data base detailing such factors as descriptions of facilities, locations and conditions.

Remember the Main

Such detailed information was needed because service men had only vague points of reference when trying to locate gas company facilities in Staten Island. The borough has many dirt roads or partially paved ones, and "the service man would have to remember the gas main for a site was 16 feet from the shrub in front of house #42 when he was out there a year before," John Parker, chief draftsman, explained.

With a detailed map, you can show fire hydrants, dwelling shapes, manholes and other points of reference. You can pin a location to a finite piece of geography. This means our information for service men is much better, and they can find buried pipe for maintenance reasons much more easily," he said.

"Also, if there's a shutdown, for instance, they can easily identify how many customers are affected and accurately plan the manpower requirements," he added.

But the Raytheon material is like a snapshot, frozen in time, and Brooklyn Union Gas needed a system to continually update and adjust the maps and data. Last summer, it requested bids from vendors for an interactive graphics system that would enable the utility to work with the Raytheon material.

Several Proposals

Brooklyn Union Gas chose the Calma system over several other proposals because it could handle the information best and provide the best route for expansion to other future projects, Parker said.

The specific Calma Graphic Interactive (CGI) is comprised of a Data General Eclipse minicomputer, a Century 25M-byte disk, a Wangco 10 tape drive, a large digitizing station, a tablet editing station and a Calcomp 960 high-speed plotter with a Calcomp 925 controller. Also, the two work stations have 19-in. CRTs.

Operating at either work station, draftsmen can display on a CRT a section of map that needs revision or updating and mark in the appropriate adjustments. This becomes part of the revised data within the computer for future use.

The CGI will be used to maintain the new digital cartographic data base for Staten Island. This data includes all gas company facilities including the distribution network of pipes, valves, clamps and fittings; plottable data such as lines and symbols; and textual data.

The graphic system used by Brooklyn Union Gas Co. allows the operator to display a section of the map and enter additional information into the data base.

Also, it will have geographic information on all features visible in aerial photographs, such as curbs, house fronts, manholes, hydrants and approved (planned) roads. In addition, cartographic cultural information not photograpically visible and not a part of Brooklyn Union Gas facilities will be included such as house numbers, street names and names of parks and cemeteries.

Calma and Brooklyn Union plan to jointly develop a network trace ability using the graphic data base.

If an operator wants to determine which part of the network in an area is composed of steel pipes, as opposed to cast iron ones, he will be able to point to a piece of main and ask the machine to trace the entire steel network before other materials take over.

Posts Quick Reports

Small System Keeps Wall Street Bond Firm Bullish

Special to Computerworld

NEW YORK — With the new National Association of Security Dealers (NASD) rule requiring members to produce a trial balance for inspection on 24 hour notice, computers can spell the difference between success or failure for many Wall Street firms, according to one such user.

"If we didin't have our small business computer, we'd be behind in posting and we simply couldn't permit that with the new NASD rule," Patricia Buckhaut, vice-president of Ehrlich-Bober and Co., Inc. here, said.

As a municipal bond and note dealer with gross profits last year in excess of $5 million, Ehrlich-Bober must adhere to very complex reporting requirements associated with the delivery and ownership of municipal bonds and notes, as well as U.S. Government securities and Certificates of Deposit.

"When we started looking for a computer a little over a year ago, the only office function we had automated was the typing out of confirmations," Buckhaut explained. These are the documents that must be sent out immediately to buyer and seller acknowledging the trade and stating what has been bought and sold at what price.

With the help of a consulting firm that specializes in financial applications, Ehrlich-Bober installed a Basic/Four Model 400 with software designed to produce some 20 different reports. The system includes 16K of memory, two 4.2M-byte disk drives, two CRTs and a printer.

"With the old method it took two to three minutes to do a confirmation order," Buckhaut noted. "Now our system can do at least two per minute. Before we installed the system, we were putting through 75 to 100 trades a day. Now we're handling anywhere from 200 to 350 a day. We simply couldn't handle the business we're doing today using the old approach.

"The daily blotter is another facet of our operation that is extremely important to bond dealers and without a computer to keep a daily tally of purchase vs. sales and profits vs. losses it would be next to impossible to control the flood of paperwork," she continued.

In addition to confirmations and the blotter, the other daily reports produced by the Model 400 include: an inventory of bonds currently owned, a location report on bonds out on repurchase agreement, a settlement data inventory, security records showing the exact status and location of all bonds involved in the company's trades and a fail report indicating what bonds were not received when they should have been.

Denver Church Puts Faith in DP

(Continued from Page S/2)

improving the ministry of the church. For instance, Wellman maintains an incredibly busy schedule. The computer will be able to help him schedule his time more efficiently and productively. He will be able to coordinate his activities to reach more members of the congregation in a personal way, while maintaining his public commitments.

"Another area where the unit will help is in designing the most efficient routing and arrangements for the annual national tour of the church's Tact Singers (Teen Action for Christ Today), Messer said.

"But we've only begun to scratch the surface," he continiued. "Our Outreach program, for example, is intended to support the basic mission of the church — we want more and more residents of Denver to become aware of and involved in the activities of the church. By using available demographic data in the computer, our Outreach program can be more productive, more efficient," he added.

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Mini-Based Signaling to Boost Rome Subway Safety

ROME — The last European capital to have an underground railway is soon to open what has been called one of the most advanced, highly automated and safest metro systems in the world.

A minicomputer-controlled automatic signaling system is at the heart of the metro and has been credited with enhancing the system's safety and efficiency.

The first stage of the new system will be a line crossing the historic center of the city from the Raccordo Anulare to Termini (via Tuscalona to Anagnina Station). It will start taking passengers in 1978.

Construction has been handled by Intermetro, a company financed with private and public capital. It has extensive experience in designing underground railway systems in a number of Italian and foreign cities and has also been responsible for equipment installations and rolling stock.

The automated signaling system incorporates four Data General Nova 2/10 minicomputers with 64K bytes of core memory, a punch card reader, a 2.5M-byte disk, two CRT terminals, a line printer and a multiprocessor communications adapter.

Two of the processors are providing a fail-safe backup. These are installed in the central signals office in Vittorio Emanuele and will control the entire line.

Positions of each train in the system are shown precisely on a dotted line diagram central display with each dot representing a short section of track. As the train moves from one section to the next, signals are sent to the Nova processors which then update the display.

When a driver takes charge of a train he enters the train number and destination code on a preselector. This information is received by the Novas and transmitted to a central processor which interprets it and returns it to the Novas for transmission of coded signals to all stations along the line. As the train arrives at each station a visual display shows the driver the accumulated variation from his original schedule, allowing him to speed up, slow down or vary his wait at stations.

Line supervisory staff can intervene to modify a driver's run schedule in case of changes in operating conditions and can override driver commands by halting trains at stations where no scheduled stop has been planned. Remote control can even extend to reversing a train into a station. And a reversing command, either from the driver or remotely from the signal office, automatically changes the points.

Additional safety is provided by a complex system of blocks and cross-referenced controls which makes sure interference with other trains on the same line is avoided. Processor control was considered necessary because of the high frequency of train movements and the need to make optimum use of the line which involves fast unrestricted runs in conditions of absolute safety.

'Guarded' Minis Serve Needs Of Large Toronto Restaurant

(Continued from Page S/2)

On arrival at reception, the guest gives his name to the operator to verify his reservation. If the table is free he is sent up to the restaurant immediately. Should the table still be occupied, the guest will be put at a vacant table or requested to wait a few minutes until the waiter has signaled the system that the table is free.

Once at his table, the guest's order is taken by a waiter using a requisition form. The order is filled and the requisition given to the cashier. Menu item number and quantity are entered into the system after which the bill is printed out.

When the customer pays and leaves, the waiter signals the system via a TRW function pad, that the table is now vacant. The table is again displayed on the receptionist's CRT screens for reassignment.

The system cost $300,000 not including the TRW devices. Of this amount, about 70% was for hardware, Le Blanc said.

Food, Beverages Monitored

Aside from the key aspects of reservations and billing, the food and beverage system is most critical to the proper operation of the restaurant, he noted.

Preset cash registers collect sales data by menu item and prepare a bill for payment. At shift end cashiers balance to tape summaries. The register tape provides menu item and sales dollars which are fed into the system.

City ledger and charge settlements are entered by cashier and accumulated by transaction type. The remote charge device provides answer-back for blocked or invalid name combinations.

At shift end the cashier enters all sales in summary by menu item. The remote charge device answers invalid menu item numbers and checks entry addition.

When balanced the system prints the value of cash that should be on hand and the amount of charged tips by waiter number. The cashier balances to this shift end report and turns over the appropriate charge slips and cash to a head cashier.

The total sales by menu item are accumulated for each outlet for each shift period. This information is converted into units sold and stored for food and beverage potential analysis.

The sales volumes by menu items are stored for analysis by predictability. When forecastable sales data can be generated based on known variable input parameters the menu item distribution per sales outlet is used as input to the menu explosion system.

The forecast sales distribution is extended by ingredients by menu item for each outlet. The ingredients in consumption quantities are converted to issue quantities and printed to provide the issue requirements for each sales outlet.

Based on menu explosion output the required items are withdrawn from stores. If perishable and not inventoried, purchase activity is initiated through a direct request routine. This is simply the menu explosion output modified to show actual issues.

When direct requests have been entered, the computer reviews the quantity on hand and minimum stock level for all inventory items. Where necessary it generates a purchase activity request for the reorder quantity.

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A Desirable Alternative

Turnkey Way Lets Library Focus on Books, Not Bits

By Chris Stuppy
And Bill DeGroff
Special to Computerworld

BOISE, Idaho — The application of computer technology to the operations and management of libraries is not a new concept. However, until recently computers were a luxury usually limited to large university libraries and the public libraries of the largest cities and counties.

These early library systems had some serious limitations; they were card- and printer-oriented, providing limited flexibility, and were often part of a larger system shared by a number of users. Usually library programs had poor priority in the daily processing and software development schedules of the computer center.

But a more serious problem was that the medium and small libraries could not implement even the most rudimentary of computer systems due to financial limitations and the lack of technical experience.

Fortunately, the industry has produced two phenomena which are extending the practicability of applying computers and computer technology to more libraries. The first of these phenomena was the minicomputer with its associated dramatic reduction in hardware costs. The second, and probably a direct result of the first, was the emergence of turnkey system houses.

A turnkey system house can develop a highly sophisticated and affordable system for libraries by amortizing the high development costs among a large number of libraries which function in a similar manner. These turnkey computer systems are not merely glorified card pushers, but are capable of functioning in an interactive environment.

As for the technical expertise required to implement such a system, the turnkey system house provides a very desirable alternative to development of an expensive in-house staff of computer experts.

In 1974, Boise Public Library began investigating the feasibility of implementing some type of computerized circulation system. The most common approach at that time would have been to include the library application in the city DP organization running library programs on a large computer shared with other city departments.

However, a second approach was considered due to the interest of library management and of Boise City's newly formed DP organization which was itself considering the feasibility of decentralized DP using minicomputers.

In February 1975, Boise Public Library installed a turnkey system developed and marketed by CL Systems, Inc., an organization whose only product is library systems. This system is designed to handle circulation transactions, reserves and overdue processing as well as serving as a data base of library holdings and patrons.

Bar encoded labels similar to those on grocery items (universal product codes) are used for identifying library materials and patrons rather than the punched card technology so prevalent in early library systems. High-volume check-in and check-out operations are conducted by circulation personnel who scan the labels with a light pen.

In addition to circulation processes, the system can be used to inquire on the current status of any book, film, record or other library material from one of three CRT terminals located throughout the library.

Another feature is the ability to place a reserve (a hold) on any library material even if it may be checked out to another patron. During the check-in process, a clerk is alerted that the item is on hold and a notice will be automatically printed for the first person on the waiting list.

The automatic issuance of overdue notices is another feature. Statistics on patron activity and library holdings provide the library management with valuable information on library utilization. These features are directed at the improvement of library operations and increasing community utilization of library resources.

Another function of the Boise Public Library system is the book ordering feature devised by staff members. Books are entered into the data base and an order form is printed simultaneously. The location of the material is determined by checking the item out to the book supplier when ordered and checking the item in when received.

Training Critical

A primary concern prior to the acquisition of the computer was the ability to operate the system on a day-to-day basis without expensive computer technicians onsite or extensive training of library personnel.

Since none of the library staff had experience with an in-house computer system, their first exposure to this system was considered critical

As is consistent with most turnkey systems, training of library staff was conducted by the vendor. The customer service representatives were professional librarians familiar with library operations.

Another important aspect of a system installed in a nontechnical environment is the level of continuing service. Since Boise is located nearly 80 miles from the nearest CL Systems service facility, this was especially critical.

Trouble Desk Service

A telephone trouble desk service is provided to customers and is staffed by personnel familiar with library operations as well as the hardware and software aspects of the system.

Trouble desk personnel are able to diagnose the problem by having library personnel display register contents through the computer sense switches which are coded by color and number. The problem is recreated at the vendor's site and a solution developed.

Boise Public Library has now invested slightly over $100,000 in this computer system. For this expenditure, we have a system which performs all essential day-to-day circulation functions, provides patron access to the collection and provides library management with valuable tools for optimizing the utilization of library resources.

Stuppy is a staff member of the Boise Public Library and DeGroff is with the Boise City Municipal Systems department.

iggest competitor.

For Great Flexibility

Hospital Requires Versatile Turnkey Environment

By Bob Harbort
Special to Computerworld

ATLANTA — There is a growing trend among American hospitals to utilize small, dedicated computer systems in medical services such as radiology, nuclear medicine, clinical laboratory, radiation therapy, cardiology and patient monitoring.

The hospital environment requires a turnkey operation of these systems so that they may be effectively utilized by medical personnel without a technical background in computers. On the other hand, highly structured turnkey operations quickly become obsolete because of rapid developments in medical technology.

At a minimum, dedicated medical computer systems must allow user modifications of tables, displays and report formats. It is also desirable to have a mechanism for implementing totally new applications within the turnkey environment.

While support of such dedicated medical appplications might seem impossible to approach from a turnkey standpoint, the costs of personnel and equipment require it.

The Crawford W. Long Memorial Hospital here is a community hospital associated with Emory University. A gift from the Carlyle Fraser Foundation has enabled the Crawford Long Hospital to start a referral center for the diagnosis, treatment and prevention of cardiopulmonary diseases.

Two Hewlett-Packard 2100-based turnkey systems provide a variety of information handling capabilities within the Carlyle Fraser Heart Center. Both systems have 32K CPUs, cartridge disks, data acquisition subsystems and a variety of peripheral devices including three printers, 11 terminals, a plotter and a Graf Pen.

The systems were purchased from HP and installed in 1974 and 1975. The first system to be installed was the 5600A patient data management system which provides medical record-keeping patient monitoring capabilities for 32 intensive care beds.

The other system is a 5600B catheterization data analysis system which is used for the real-time recording, analysis and storage of data from cardiac catheterization procedures. Both systems came equipped with software which allowed turnkey operation from the day of installation.

System Adaptable

Patterns of delivery of medical care have changed in the last two years at Crawford Long Hospital, partly due to the influence of the computers and partly due to general advances in medicine. If these turnkey systems were operating today the same way they were when they were installed, they would be almost unusable. By providing a little extra capability while maintaining the appearance of a turnkey system, HP has enabled the staff at Crawford Long Hospital to modify the systems to keep up with their needs.

The 5600 systems provide a unique intermediate link between general-purpose computer systems and turnkey applications. This is accomplished by having the 5600 software operate within a standard computer system environment rather than as a stand-alone program.

Both the computers at Crawford Long run versions of HP's standard real-time executive (RTE) with the turnkey applications being, from a computer systems standpoint, nothing more than a collection of Fortran programs scheduled by one another and accessing certain of the peripherals. In this way, the systems present a dedicated appearance to the casual user because they have no operator and are maintained by medical personnel.

Having a general-purpose operating system allows great flexibility in redefining portions of the system that are table driven. Displays and plots can be added, deleted and modified on-line by interacting with a configuration program. A virtual A/D driver allows user-defined data acquisition configurations. These capabilities allow medical personnel to have a great deal of control of system configuration.

There are times, however, when changes in medical practice require implementation of entirely new applications within the turnkey environment. Since the computer system is operating with RTE, a staff of programmers can use the text editor and the compilers, without interfering in normal operation of the turnkey system, to add new programs.

Modular Software

A major advantage of the vendor-supplied software is the modular way in which it was written. Many of the support routines such as the terminal handler, the file handling routine, device drivers, the virtual A/D routine and the menu prompting routine for the turnkey system are in a standard RTE library and are available for use by applications programs. This enables the medical programming staff to add programs, test them and then put them on-line, at which time they become a part of the turnkey system.

In addition, statistical and administrative information is also easy to get since the files in the turnkey system are a part of the normal file structure of RTE.

Crawford Long Hospital has made extensive modifications to both systems, both within the turnkey environment and by writing other programs not accessible through the turnkey portion of the systems.

Perhaps the best example of how such a hybrid system is helpful is the implementation of a second, completely different application on the 5600B system. This second turnkey system appears to its users as a dedicated pulmonary function lab, just as the cardiac catheterization laboratory appears dedicated to its users. Both systems reside on the same host CPU and use many common support programs and device handlers.

It has been the hospital's experience over the past two years that turnkey medical applications can be justified in terms of cost and increased benefit to the patients. Systems must present a turnkey appearance since for all but the largest installations a computer support staff is prohibitively expensive.

Harbort is Director of Clinical Engineering at Crawford Long Hospital in Atlanta.

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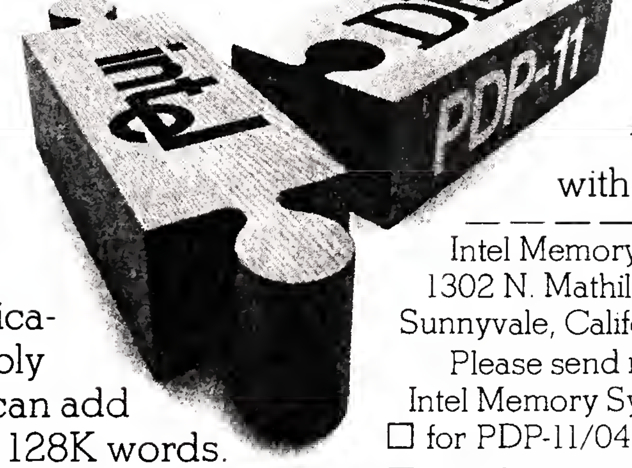

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Distributed Processing Today. In 1977, hundreds of distributed processing networks are serving American corporations in such industries as retailing, transportation, manufacturing, wholesale distribution, banking, insurance, stockbrokerage and medical services. In implementing distributed processing, these companies have learned that optimal performance requires remote display/processing systems flexible enough to be precisely scaled to the needs of each individual site.

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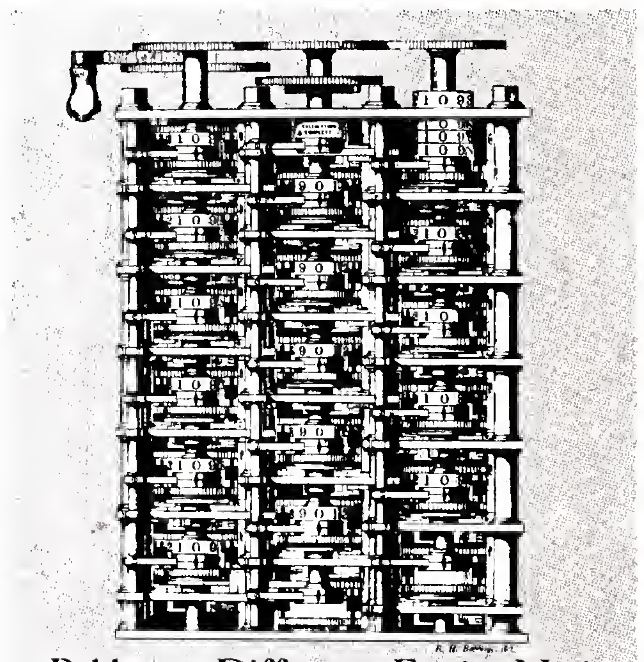

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Orderly Growth Path. The flexibility offered by the clustered display concept is an important component of Four-Phase Systems' orderly growth path plan for the implementation of distributed processing. When a network evolves along an orderly growth path, each increment of growth is triggered by economic benefits proven in the previous increment. This unusually cost-efficient way to implement a network is made possible by the unique hierarchy of equipment developed for distributed processing by Four-Phase Systems.

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Bits & Pieces

'Pepe' Makes Appearance At Army Technology Center

HUNTSVILLE, Ala. — Pepe — the Parallel Element Processing Ensemble — has been delivered to the Army's Ballistic Missile Defense Advanced Technology Center here.

The system, built by Burroughs Corp. under contract to Systems Development Corp. (SDC), joins the Illiac IV in the class of "super" parallel processors.

For the system, SDC developed the specifications and the architectural design to the register level and Burroughs performed the gate-level logic design and the electrical and mechanical design as well as the fabrication.

The unit has a Control Data Corp. 7600 as host to the system and 288 processing elements or slave processors. Each element consists of three processors sharing a common memory.

The architecture permits changes in the number of elements in the system and can permit "any number of commercially available sequential processors" to be hosts in the system, according to SDC.

The effective speed of the system is determined by the number of elements and the parallelism of the problem, but SDC claimed that in tests on ballistic problems, a simulated Pepe system has reached speeds of over 800 million instruction/sec.

Data Entry Source Book Offered

CHERRY HILL, N.J. — Management Information Corp. (MIC) here has compiled a two-volume, 600-page basic technical information source for data entry operations which it said can be used by the data entry manager as day-to-day reference or by college and university DP programs as course material.

Volume One of *Data Entry Today* includes individual sections on Data Entry State of the Art, Data Entry Equipment (keypunches, key-to-disk, OCR, CRT terminals, point-of-sale systems, etc.), Source Data Automation, Selection Methodology, and Data Entry Case Studies.

Volume Two includes comparison charts and detailed technical evaluations on some 50 major data entry products, plus a description of each equipment submarket.

The information source is available for $50 per copy from the MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

Because of 138, 148

Used 135s, 145s Going for Half of New

By Mal Stiefel
Special to Computerworld

Sale and lease prices of used IBM 370/135 and 370/145 CPUs have dropped to 50% or less than those of new equipment — with more erosion expected to follow — in the wake of IBM's announcement of the models 138 and 148 last July.

According to a recent poll of dealers and leasing companies, a typical used 135 with 512K bytes of core today sells for about $325,000; a new unit from IBM costs $650,000 to more than $700,000, depending on features.

Used 145s are changing hands for close to $475,000 compared with $1.1 million or more for new equipment, the poll found.

In comparison, the list price for a 138 with 512K bytes of core, claimed to be 30% to 35% faster than a 135, is $350,000. The price tag on a new 148 with 1M byte of main memory is $689,000. The 148 is 26% to 43% faster than the 145, IBM said.

Lockstep Movement

Lease prices have moved in lockstep with selling prices. A five-year lease on a 512K-byte 135 costs $7,000 to $9,000 per month; on a 1M-byte 145, the lease price is $11,000 to $12,000 per month.

The survey also revealed that:

- Prices for used 135s and 145s ranged from 65% to 75% of list prices before the 370/138 and 148 were introduced.
- A further price drop from current levels is expected by mid-year, when deliveries of 138s and 148s will be in high gear.
- CPUs in the 360 line were largely unaffected by the 138 and 148 announcement.
- The markets for other vendors' used equipment also were not affected.
- Leasing companies with 135s and 145s in stock are likely to come up with product enhancements and easier terms in order to attract customers.
- The 138 and 148 were unveiled to bolster the sagging market for new mid-size CPUs.

Announcement Shocking

The bid price on used 145 CPUs dropped from $600,000 to $400,000 as users reacted with shock to IBM's move last July, according to William Grinker, executive vice-president of American Computer Appraisal Service of Boston, a division of American Used Computer Corp.

But very few transactions took place at the $400,000 level, he pointed out. The price of a 1M-byte Model 145 rebounded quickly to $475,000, where it now sits.

Similarly, the used 135 today is selling for $325,000 (about 47% of the new equipment price). This represents a sharp decline from the preannouncement level of $400,000 to $425,000 or 62% to 65% of the price for a new system.

Further price drops will be seen later this year as the 138 and 148 supply increases, Grinker predicted. The new models will have a long-term effect on the entire low- and mid-range market, depressing used equipment prices across the board, he said.

No Fluctuations Yet

Grinker has seen no fluctuations yet in the 360 market or the market for other vendors' CPUs as a result of the announcement. The 360/65, which had been trading for about $300,000 before last July, is still at that level.

Coincident with the announcement, 360/40 prices plummeted to the levels they were selling at two years earlier, but the events weren't related, according to Grinker. Prices for the 360/40 had been artificially inflated because of a lack of sup-

(Continued on Page 42)

NBS Proposes Four Standards: One on Linking, Three on Media

By Esther Surden
Of the CW Staff

WASHINGTON, D.C. — A proposed standard for I/O channel interfaces that may mean significant cost savings in the future to system users has been announced by the National Bureau of Standards (NBS).

The bureau also proposed three standards for magnetic media.

The adoption of the standard as a Federal Information Processing Standard (Fips) will "in time allow user flexibility in interfacing CPUs with peripherals of any manufacturer," according to Jack Biddle of the Computer & Communications Industry Association.

Defines Parameters

The proposed standard is the first of a planned family of computer peripheral interface standards. It defines the functional, electrical and mechanical parameters for attaching peripheral controllers to a system, an NBS spokesman explained.

When fully implemented in federal applications, the standard will help ensure the economical procurement and effective use of systems in federal installations by allowing them to be configured with components procured from multiple competitive sources and drawn from inventory, he said.

If the standards are adopted, mainframers will have to offer them as an option on systems and peripherals sold to the Federal Government, Biddle stated, and eventually the public will reap the benefits by being able to obtain the option and configure optimized systems.

Magnetic Media Standards

The NBS also proposed three standards for magnetic media, specifying the recorded characteristics for 1/2-in. tape at 6,250 char./in., cartridges 1/4-in. wide at 1,600 bit/in. and magnetic tape cassettes .15-in. wide at 800 bit/in.

When implemented, these standards will allow easier interchange of data recorded on the media, the NBS stated.

The magnetic media standards represent federal adoption of voluntary industry standards that were developed under the auspices of the American National Standards Institute (Ansi).

The I/O interface standards were developed by Ansi with participation of both the industry and federal agencies.

Comments Deadlines

Users wishing to comment on the proposed interface standard must do so before March 31.

Copies of the standard can be obtained from the NBS office of ADP Standards Management, Washington, D.C. 20234.

Copies of the magnetic media standards are available from the Associate Director for ADP Standards, Institute for Computer Sciences and Technology, NBS, Washington, D.C. 20234. Comments will be accepted through Feb. 15.

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Hospital Holding Firm Finds DP Unity Brings Savings

By Clay D. Edmands
And Howard E. Abrahamson
Special to Computerworld

MINNEAPOLIS — In 1974, Fairview Community Hospitals (FCH), multihospital holding company based here, took over management of the 35-bed Community Hospital in Princeton, Minn., a town of 2,500.

The Princeton institution had lost money in four of the five previous years and was budgeted for a $35,000 loss that year. Instead, it finished $7,000 in the black.

And, in fiscal 1976, net income for the Princeton Community Hospital was $57,000. A lot of credit for that profitability goes to FCH's approach to DP.

Since 1971 FCH, now nearly a $45 million organization, has pioneered the concept of a multihospital holding company system. With our system, all units band together in a flexible, interdependent relationship which takes advantage of what is valuable in bigness, such as economy of scale, while retaining local autonomy.

For example, the overall costs at the three hospitals we own are increasing at a rate below the national hospital index.

For these owned hospitals, accounts receivable reduction achieved through automated aging by our Univac 90/60 saves more than $200,000 a year.

The same accounts receivable procedures applied to some of the other hospitals we serve has decreased turnaround time on receivables by 10 to 20 days — in the face of a trend of increased receivables elsewhere during the recent economic turndown. Bad-debt write-off has also been reduced.

The hospitals to which we provide computerized inpatient accounting services have all gained about $2 per acute patient day in formerly lost charges — and there are some 480,000 patient days on our system.

More than half the hospitals that use our DP services also achieve clerical savings. Typically, one institution has reduced personnel by 11% through attrition and transfers.

Other benefits vary, because we serve the broadest possible mix of institutions whose only commonality is that all are nonprofit institutions. But additional savings include substantial reductions in inventory investment, reduced purchasing costs, reduced costs of producing payroll and space savings.

DP Plays Key Role

While we consider all the services FCH offers to be important, DP certainly plays a key role, not only for the specific applications it upgrades, such as billing, but also because it ties the whole FCH package together.

This is literally accomplished via our communications process which involves 15 intelligent terminals and a dial-up phone service linking us to participating institutions.

Figuratively, it also ties in in terms of improved management services.

Further, DP is a means of implementing good management principles within an organization and also of imposing a discipline on operating personnel.

Although we have more than doubled our DP budget since 1970, per-patient costs have not increased significantly because we now serve institutions with almost three times as many beds. Also, our present computing equipment provides an excellent price/-performance ratio.

In fact, this has been the case with each of the Univac systems we have used since we switched to them in 1971. We first installed a 9400 system; put in a 9480 system in 1974; and installed the present 90/60 computer in January 1976.

The 90/60 is a 512K-byte main storage system with six disk units and five tape drives.

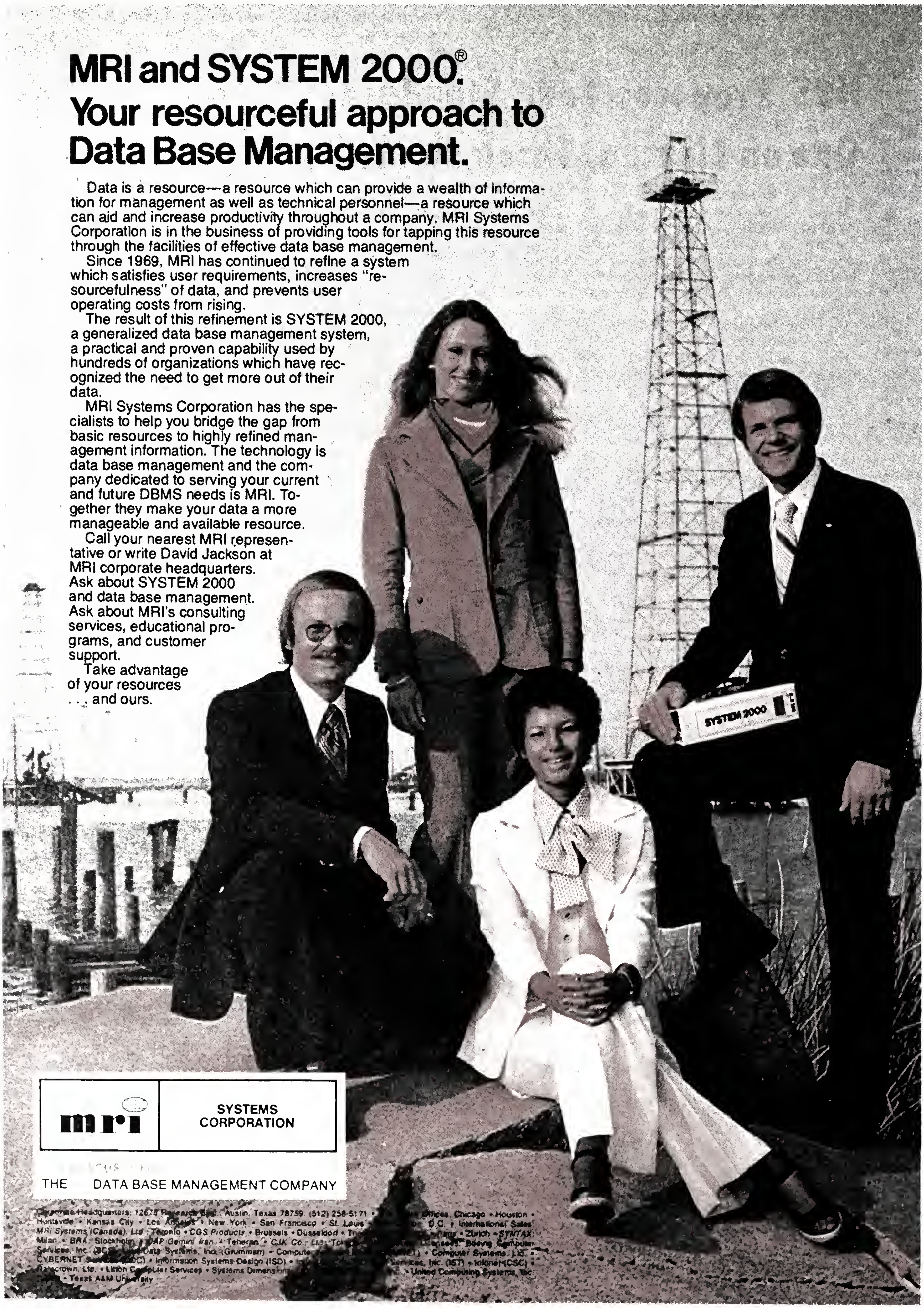
Always on Time

Incidentally, in almost eight years of operation, our computer center has never failed to deliver a payroll on time or to provide laboratory results charting for doctors' rounds. However, to assure that this record will be maintained, backup working agreements exist with three Twin Cities companies, one of which is Univac's own data center.

At FCH, DP bends to the needs of the hospitals. It is recognized as a service which exists solely to meet those needs. Each proposed DP application is carefully evaluated.

Currently, our 90/60 provides services in 11 major application areas: billing, personnel/payroll, general accounting, stores inventory, asset accounting, accounts payable, clinical laboratory reporting, patient histories, medical records, public relations and fund raising.

Edmands is assistant administrator and Abrahamson is director of management information at FCH.



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Introduction of IBM 138, 148 Eroding Cost of Used 135, 145

(Continued from Page 39)

ply; the supply happened to come back up just as the 138 and 148 made their debut, he explained.

New 135s and 145s were too high-priced, so sales lagged as users sought other alternatives, Grinker said. The 138 and 148 were intended to correct that deficiency.

Market in Flux

Svend Hartmann, president of Computer Merchants, Inc. of Chappaqua, N.Y., concurred with Grinker's view of the past, present and future impact of the 138 and 148.

Citing slightly higher price levels, Hartmann asserted 135 and 145 transactions have taken place since Dec. 1 in the 47% to 52% (of the new hardware price) range.

He also quoted higher pre-July prices, saying the 145 sold for 73% to 75% of list and the 135 for 70% to 72% of list before the announcement.

Hartmann sees a declining market later this year, with dealers now offering 35%of list on used 135s and 145s to be delivered in the spring.

The market will remain in a state of flux through 1977, he forecast, adding it won't settle down until price differences between used 135s and 145s are firmly established.

Total system costs have remained more stable than CPU prices in the last six months, Hartmann continued, because peripheral prices, which add significantly to system costs, haven't changed.

Lease Terms Affected

Lease prices for used equipment, which are tied to sale prices, have come down since July and are also expected to continue sliding, according to Tom McArdle, president of National Computer Rental, Ltd., a leasing firm based in New York City. McArdle is also president of the Computer Lessors Association.

A five-year lease for a 370/135 with 512K bytes of main memory initially cost $9,500 to $10,500 per month. The current range is $7,000 to $8,000 per month, and McArdle expects prices to fall to $5,000 to $6,000 by June.

Before the announcement, a 1M-byte 145 leased for $14,000 to $16,000 per month over five years. Right now prices are down to $12,000 to $13,000 per month. And in June or July, prices will be in the vicinity of $9,000 to $11,000 per month, he said.

McArdle foresees two- to five-year leases instead of the present four- to eight-year contracts. In addition, he indicated hardware (e.g., add-on memory) and software enhancements will be made to sweeten the deals for 135s and 145s.

Tom Takash of Greyhound Computer Corp. in Phoenix agreed with McArdle on 145 lease prices but differed somewhat on the 135.

The five-year lease for a 512K-byte 135 cost $11,000 to $12,000 per month before the announcement, he said. The current price is $9,000 monthly, and he looks for $6,000 by June.

The 370/155 was affected by the advent of the 138 and 148, Takash said, noting its sale price dropped to $50,000 to $60,000 since last summer, with a corresponding $2,000 drop in monthly lease prices.

Takash isn't concerned about the possibility of 135s and 145s glutting the market. Leased machines, he said, will remain on lease.

Outright sales will come from user-owned equipment; there aren't likely to be many offered for sale at a given time, he argued.

Zeta Expands Line Of Plotting Systems

LAFAYETTE, Calif. — A minicomputer-based plotting system from Zeta Research, Inc. combines a CPU, 12- or 36-in. plotter and communications capabilities, according to the firm.

The Series 5000 plotting system, which can operate on-line via RS-232C communications lines or off-line by adding a magnetic recording device, uses a Digital Equipment Corp. PDP-11 minicomputer.

The mini receives and stores the instructions and data from a host CPU. The data is decoded and transformed into vector data and the maximum acceleration/deceleration consistent with the vector length and current speed and direction of the plotter is determined, a spokesman said.

The Model 5036 with the 36-in. plotter costs $27,400 while the Model 5012 with the 12-in. plotter costs $16,950. Zeta is at 1043 Stuart St., Lafayette, Calif. 94549.

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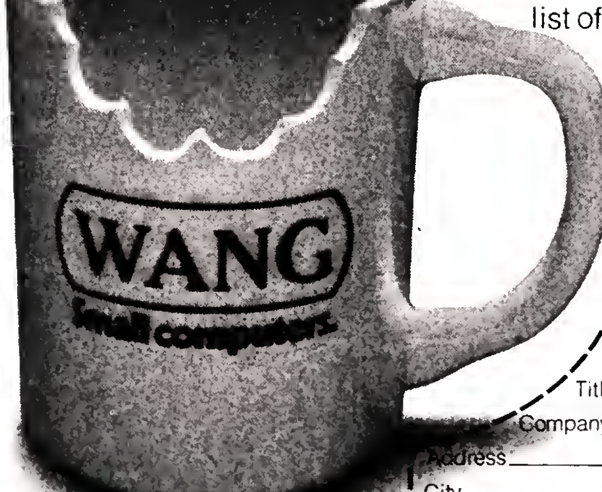

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Mini Dedicated to Preprocessing Increases Bank's Loan Capacity

WINSTON-SALEM, N.C. — A dedicated minicomputer acting as an installment loan preprocessor has enabled Wachovia Bank and Trust Co. here to increase its loan entry capacity.

The bank's Retail Installment Loan Department handles installment and single-payment loans to individuals (simple interest) or through auto dealerships (discounted) at each of the bank's offices across North Carolina.

By 1971 the department was processing more than 300 loans each day on the bank's main computer. The department was "filling out keypunch forms and running them through keypunching equipment," according to Jerry D. Gilbert, assistant vice-president in retail loan accounting.

"We were also asked to try out OCR," he recalled, but that was scuttled because "everything had to be perfect" for the OCR equipment at that time. Then the department tried using key-to-tape equipment, but experienced a high error rate.

Because of the lack of success using the other methods, the bank decided that the loan department should have its own dedicated minicomputer.

Access, Service Cited

"Although I wasn't around when the selection of the system took place in 1971, I have a pretty good idea why the Digital Equipment Corp. hardware was chosen," Gilbert said. "At that time DEC was just about the only one with a high-speed disk" and it had a local field service representative, he noted. File access and service were the bank's prime criteria, Gilbert emphasized.

The department settled on a four-terminal PDP-11/20 system with both Dectape and industry-compatible magnetic tape drives and RSTS time-sharing software.

The equipment was delivered near the end of April 1972 and, with application programs written entirely in-house, became active just after mid-year. Loan entry was phased over from key-to-tape to video terminal input, and the system assumed the bank's installment loan entry load with the exception of the computation of disclosure amounts on odd-repayment-schedule contracts, which were handled on a leased time-sharing terminal.

At the same time, steps were taken to simplify the data preparation process. Note forms were redesigned to allow terminal operators to key in data directly from the customer-signed agreement, eliminating the need for filling out an annual total of 100,000 keypunch establishment sheets.

Also, the system computed annual percentage rates and repayment installments, discounted dealer contracts and allocated dealer reserves according to the agreement peculiar to each dealer; this removed the need to calculate these figures manually at either home or branch offices, Gilbert said.

Operating interactively, the computer system presented a format for loan entry on each video screen and compared each entry with established tolerances. If mistakes occurred in date, repayment schedule, percentage rate, borrower's age, loan classification or dealer identification number, error messages flashed at the top of the screen and the system would not accept the loan until the mistake had been rectified.

Loan processing now required far less time and fewer hands than before, and by preventing most keying and calculation errors from reaching the central system, the loan department's computer reduced loan rejections to a fraction of 1%.

System Outgrown

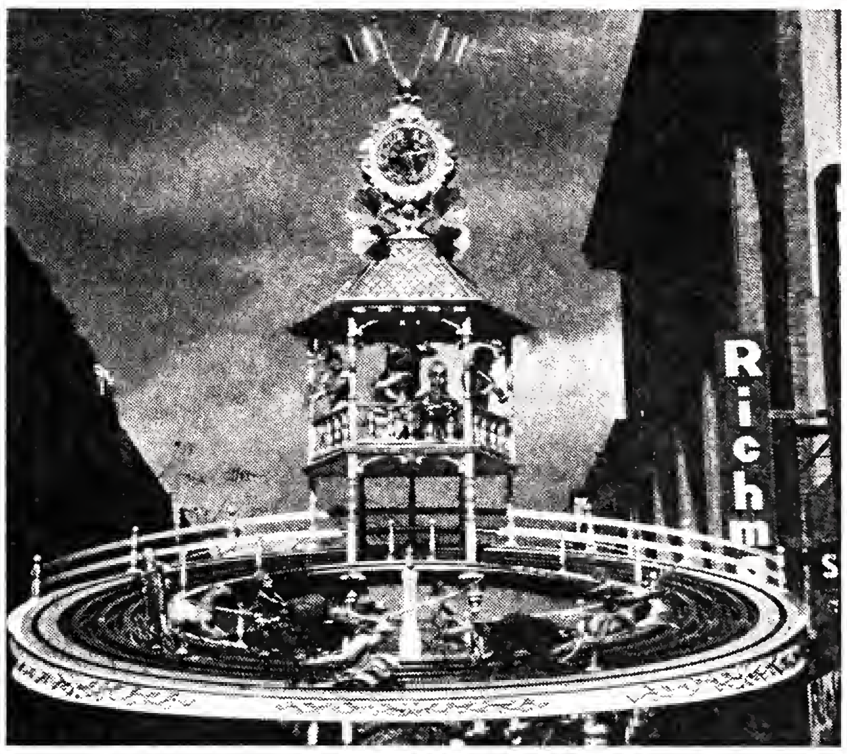
The original configuration was expected to serve Wachovia's needs for several years, but a surge in loan demand since 1973, encouraged by a favorable economy and the availability of simple-interest loans, began to put pressure on the system, Gilbert said.

Much time was consumed by disk searches and swapping of data and programs between disk and core because of the system's limited internal memory and each terminal operator's frequent need for file data. Although all four terminals were in constant use, system response prevented loan processing from reaching 400 loans per day.

In May 1973 the bank replaced the PDP-11/20 with a PDP-11/40 equipped with 64K of memory to contain operating system software and 8K-word segments for each of five operators. Disk support was doubled and display rates were increased from 300 to 1,200 bit/sec for faster formatting and overall performance. RSTS/E (Extended) software was supplied to improve I/O performance and response time.

Since then Wachovia has added a moving-head disk cartridge drive and a Decwriter printer terminal. A disk cartridge now contains the system software, leaving the faster-access, fixed-head disks for dealer reserve and loan classification data most frequently used. The Decwriter replaced a slower teletypewriter for printing of amortization schedules and loan listings, which must be done before final loan data is read onto magnetic tape for transfer to the bank's central accounting system.

The new hardware has also permitted addition of new applications, including the odd-repayment-schedule loans (e.g., to farmers and others with seasonal earnings) that had been handled through time-sharing. Money formerly spent on time-sharing services is now paying for the disk drive and Decwriter, he said.



. . . And They're Off

LOUISVILLE, Ky. — Just to prove a minicomputer can appear in the least likely places, take a look at this clock sculpture by Barney Bright. Called the Louisville Clock, the moving sculpture is coordinated by a Digital Equipment Corp. PDP-8/A system.

When the noon hour strikes, a voice on sound tape announces the "Race of the Day." A bugle calls the horses to the post and the fans begin to cheer.

The system is programmed to choose a winner at random with the average race lasting from two to five minutes. The probability of the same winner two days in a row is about 25 to 1, a spokesman said.

The probability of two horses finishing in identical order two days in a row is 14,400 to 1. The system controls signals to electric motors which determine the speed of each horse.

Memory for DG Novas

Ampex Unit Replaces Fixed-Head Disks

By Esther Surden
Of the CW Staff

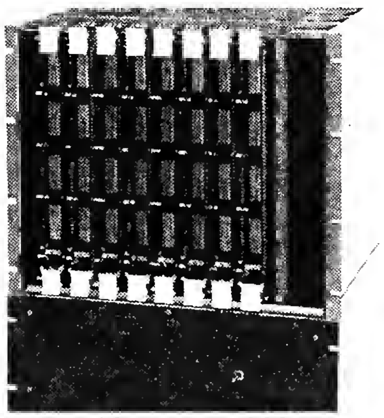
EL SEGUNDO, Calif.— Offering minicomputer users an alternative to fixed-head disks, Ampex Corp. has introduced an auxiliary core memory device said to fill the access gap betwen main memory and direct-access storage devices.

The Megastore 1223 is a plug-to-plug replacement for the Data General Corp. (DG) Novadisk used with DG minicomputers, according to Ampex. It accommodates 256K- to 2M words and fits into a standard 19-in. rack.

With an average access time of 2.5 , microsec, a 512K-byte Megastore 1223 including controller costs $12,670, Ampex said. With an average access time of 8.4 msec, the 524K-byte Novadisk including controller costs $9,750, DG said.

First Family Member

The Megastore 1223 is the first in a family of core memory devices. Other units to be announced will provide plug-compatible storage for the Digital Equipment Corp. PDP-11 line and will serve as generalized systems which can be adapted to other minicomputers, Ampex said.



Megastore 1223

The Megastore controller is functionally equivalent to and physically replaces the DG 4019 control card within the CPU, according to a spoksman.

The memory itself, which features a transfer rate of 400 byte/sec, is transparent to the DG Nova 2, Nova 1200 and Nova 3 systems, the spokesman claimed.

No program or electrical changes are required to use Megastore, but users "may want to modify certain programs to enhance system throughput through better utilization of the faster access time, increased transfer rate and subsector addressing," he said.

The storage module uses the firm's Unibit cores — ceramic devices made from a ferrite material having well-defined magnetic characteristics, the spokesman said.

Replacing fixed-head disk with this type of storage is cost-effective when the user considers that "it is not atypical to refurbish or replace fixed-head disk devices every six months," he noted.

Ampex is located at 200 N. Nash St., El Segundo, Calif. 90245.

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How to get the benefits and avoid the bugs of applications software-in Computerworld's February 28th special report.

If you were the world's only computer user you couldn't avoid in-house development of all of your applications software. But when your task is common, the applications software you need has likely been developed already and is being used in many installations like your own. So your mundane task -- and many more exotic ones -- are commercially available and "in the can". All you need do is find the right package at the right price, modify it a little (or a lot) to meet your standards, and you've taken a sizeable shortcut toward computer performance.

The number of users who've chosen to acquire their applications software this way has grown rapidly, for a variety of reasons. And *Computerworld's* February 28th special report will explore these reasons -- and the results. Edited by Don Leavitt, the report will include tutorials on applications software and experts' opinions on selection criteria. User experiences with applications packages will be emphasized throughout, and the attitudes many many users hold toward modification, with and without vendor support, will be reviewed. Many timesharing networks now sell applications software as an adjunct to their services, and we'll take a look at the savings that are possible with this service. In all, you'll find a wealth of information on applications packages in the February 28th *Computerworld.* So if you're a DP manager, programmer, or someone who's concerned about the productivity and cost effectiveness of DP, don't miss it.

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DataComm 77

Dichotomy Exists

Turnkey Mini Users Experience Best of Times, Worst of Times

By Leonard Farano
Special to Computerworld

It was the best of times; it was the worst of times.

It was the age of monoliths; it was the age of minis.

It was the epoch of IMS and JCL; it was the epoch of the turnkey.

It was the season of Amdahl; it was the season of the PDP11.

It was the spring of user independence; it was the winter of data processing empires.

Minicomputer Exchange

There were "computer men" with large mainframes and staffs sitting in the themes of their user's businesses.

There were users with minicomputers and no staffs sitting on the themes of their own businesses.

In both "cities" it was clearer than crystal that things were settled forever.

Charles Dickens was describing the differences between England and France in the late 18th century when he penned the phrase so outrageously parodied above.

But his phrase could as easily apply to the dichotomy existing today between the users of large mainframes and those of turnkey minicomputers.

While there are many cases of organizations with large host computers investigating and even implementing distributed DP networks of minicomputers, most turnkey systems are being installed for unsophisticated first-time users.

No 'Ghost of DP Past'

The most significant reason for this is the lack of a "Ghost of DP Past" for the first-time user.

He is not emulating a second generation computer which is simulating a first.

He has not built an "Authorized Personnel Only" mausoleum replete with floating floor, duplexed air conditioning, Look At Our Computer Window, painted empire blue or monolithic gray.

He is not supporting a large group of "dog waggers" sometimes referred to as the DP department.

In short, he has a business to run and would like to think of computers as a utility somewhat akin to his telephone or duplicating machine which he can use without being a communications or electronics engineer.

"But what kind of business does he run?" ask the skeptics.

He is a tomato distributor in Queens, a manufacturer of precise instruments on Long Island, a retail department store in Texas, a sweater importer in Los Angeles, a photo supply store in Manhattan, a New York manufacturer of ladies pants and a fabrics distributor in Portchester.

He is an insurance broker, a barber chair manufacturer, a freight forwarder, a fruit auctioneer, a buying officer and a women's specialty store operator.

He has successfully implemented a wide variety of business applications including order entry, billing, inventory control, sales analysis, accounts receivable, accounts payable, purchase order processing and general ledger.

He has authorized credit, distributed merchandise, scheduled production, produced reports, exploded parts, printed endorsements, allocated piece goods and produced consumption entries.

He has done all of these things using the latest state-of-the-art techniques in hardware and software in a totally on-line environment at the lowest possible cost with little on no in-house technical expertise.

He has, in fact, harnessed the computer rather than be harnessed by it. His secret weapon in achieving these accomplishments has been the turnkey system.

The turnkey system is divided into three parts.

At its heart is a low-to-medium cost minicomputer with reliable hardware including video display devices and mass storage, with a simple but sophisticated, low overhead, operating system (no JCL spoken here).

The second part is a turnkey systems vendor (TSV) who will assume total responsibility for equipment selection, system design, programming, testing, installation conversion and training.

The TSV must have industry and application experience as well as technical expertise regarding hardware and systems software.

It must be prepared to service the user now and in the future from a software maintenance and application add-on standpoint.

Finally, and most importantly, the turnkey system must have a user who will provide the time and effort necessary to define his business requirements and approve the TSV's solutions.

Given the proper combination of these elements the turnkey system becomes an attractive solution to those users interested in achieving the benefits of in-house DP at lower hardware, development and operating costs.

Turnkey systems are not restricted to small companies or users without prior DP experience.

In fact, many large users, particularly banks, are attempting to utilize turnkey systems for independent divisions and areas with little or no corporate DP department involvement.

To close in a Dickensian note, turnkey systems users have avoided hard times and most have had their great expectations fulfilled.

Farano is executive vice-president of Gambit Management Strategies, Inc., a New York retail management consulting firm and turnkey minicomputer vendor.

Readers are urged to reply to this or any other Minicomputer Exchange article. This is your column, a chance for you to exchange views on the various topics confronting the minicomputer user, a chance to tell the vendors what you are thinking and to let your fellow mini users know about pitfalls or new techniques in this area. Letters or manuscripts should be addressed to Minicomputer Exchange, Computerworld, 797 Washington St., Newton, Mass. 02160. Double space, please.

Peripheral Switch Designed for GA Mini

WILTON, Conn. — T-Bar, Inc. has a peripheral switch for use with the General Automation, Inc. (GA) GA-16/440 mini.

The switch is said to provide the user with flexibility for switching peripherals.

The ability to reconfigure peripherals rapidly between multiprocessors offers both back-up capability for on-line systems plus cost savings by sharing peripherals between multiprocessors, T-Bar said.

Two versions of the switch are offered. Model 3000-749-3 is a clustered processor switch permitting one peripheral device to be transferred to up to five processors.

The 3000-749-4 is a three-peripheral switching system, providing switched access between dual processors.

These "self-contained" units can be system integrated into existing enclosures together with processors, magnetic tape units and disks, the firm noted.

Both models cost $3,800, the firm said from 141 Danbury Rd.; Wilton, Conn. 06897.

DEC Modules Extend Micros' Interface Options

MAYNARD, Mass.— Digital Equipment Corp. has announced a variety of modules for I/O and applications interfacing for its LSI-11 and PDP-11/03 microcomputers.

A direct memory access (DMA) interface option permits transfer of up to 32K 16-bit words between the LSI-11 memory and an I/O device. The option, priced at $550, transfers at rates of 250K word/sec, DEC said.

Custom Interfaces

A bus foundation module allows users to create custom interfaces to link I/O equipment to the PDP-11/03 or LSI-11 buses, according to the company. The module contains the bus interface logic and space for user-mounted discrete components or integrated circuit (IC) packages and costs $275.

An optical-isolation input module is available to isolate signals and/or convert signal levels between peripherals and a TTL-compatible interface. It costs $120.

Two high-density, wire-wrappable modules are said to permit the user to mount components for logic interface applications without the use of solder. The smaller module has space for 79 IC packages and costs $195, while a larger version that permits 114 IC packages to be mounted costs $295.

DEC also introduced a 19-in.-wide general-purpose mounting cabinet in both 115- and 230 Vac versions. It costs $390, a spokesman stated from Maynard, Mass. 01754.

TI Offering Multicopy Printer

HOUSTON, Texas — The Model 810 printer from Texas Instruments, Inc. (TI) was designed for use with minicomputer and microprocessor systems.

The 132-column multicopy printer features microprocessor control of printing functions, programmable forms control and a buffered communications interface, the firm said.

Control Selects Lines

While the data is held in the buffer, the microprocessor control selects the next line of data to be printed and directs the print head either forward or backward to achieve the shortest time to the next print position, a spokesman explained.

The Model 810 operates at 150 char./sec; its print head allows the system to make up to six permanent copies.

Ascii Character Set

The standard character set is 64 Ascii characters in a 9 by 7 dot pattern. A full Ascii character set is optional.

Delivery of the unit will begin in April. The Model 810 costs $2,250 from TI's Digital Systems Division, P.O. Box 1444, M/S 784, Houston, Texas 77001.

PDP-11 Gets Plug-In

AUSTIN, Texas — A plug-in memory system to expand the capacity of Digital Equipment Corp. PDP-11 minis is available from Motorola Semiconductor Products, Inc.

The 16K-word system plugs directly into the MM11-I memory slot of a PDP-11 and is both hardware- and software-compatible with the mini, Motorola said.

Address and select changes are made using the on-board DIP switches and jumper wires. Both 8K- and 12K-word versions are available for smaller expansions, the vendor added.

Maximum access time is 400 nsec; read cycle time is 460 nsec and write cycle time is 500 nsec.

The 16K-word system costs $1,500 from Memory Systems, Motorola Integrated Circuits Division, 3501 Ed Bluestein Blvd., Austin, Texas 78721.

Management System Built for Businesses On HP CPU Addition

PALO ALTO, Calif. — The HP 9896A business information management system from Hewlett-Packard Co. (HP) was designed for use by small- to medium-sized manufacturers, distributors and service organizations.

A standard system includes the HP 9831A desktop system, also announced; a built-in cartridge drive; two flexible disk drives; a character impact printer; and a desk workstation.

Additional Floppies

The unit can accommodte two additional optional floppy disks, HP said.

Software offered with the system includes accounts receivable, accounts payable, payroll, inventory control and general ledger, the company noted.

The system is available with the standard 8K bytes of memory or can be expanded up to 32K bytes.

The CPU itself can work with plotters and CRTs and features a built-in bidirectional tape drive with a 90 in./sec search-and-rewind speed. Average access time is 6 sec, the company stated.

The 9831A CPU costs $7,200; the total business information management configuration costs $18,700, HP said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

DSI Designs Turnkey For Order Entry Use

LONG BEACH, Calif. — A minicomputer-based turnkey order entry and inventory management system is available from Data Systems for Industry (DSI).

The system provides inventory maintenance, replenishment planning, back-order handling, order entry, shipping and invoice printing from on-line CRT terminals, according to a spokesman.

A basic system handles up to 153,000 inventory items with an average 1 sec response time for inquiries and transactions, DSI said.

Dual Processor Version

The basic system includes a Hewlett-Packard minicomputer with 32K of memory, 15M bytes of disk and a 60 line/min printer. It can accommodate up to 16 on-line terminals; a dual-processor version accommodates up to 24 terminals.

Including software, the basic system costs $80,000 or $1,680/mo. DSI is at 3450 E. Spring St., Long Beach, Calif. 90806.

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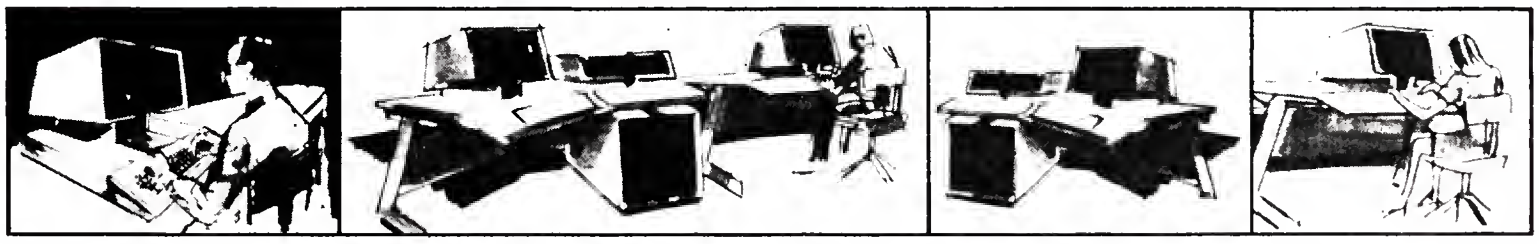

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For Brigham Young University

Mini, Optical Scanners Score A+ at Testing Service

By Mike Rossetti

Special to Computerworld

PROVO, Utah — The Testing Services at Brigham Young University, which provides test scoring and analysis for all departments at the college, is using a combination of a dedicated minicomputer and optical scanners to help speed scoring procedures and reduce errors.

The 10-year-old service is basically a two-fold operation. First, the center performs batch processing on item analysis of test questions, score distributions, records maintenance and score standardizations. The center also generates tests and scores a large number of psychological and vocational inventories.

Until recently, this work was handled by an IBM 360/65. The tests were read on Optical Scanning Corp. Opscan 17 scanners, the information was transferred to tape and then processed on the 360. This process was satisfactory but usually required overnight turnaround time.

The second phase of the operation is a Modular Testing Service.

In the modular system all tests are given in a large central location, rather than in individual classrooms. The professor for the class brings the service the tests and decides on what days the tests are to be available.

The student can take the test at one of several times, thus lessening "test anxiety," and when the exam is finished it is graded immediately.

Up until the last few months the modular operation was strictly hand-operated. The student came into the center and was given an answer sheet; once he was in the center there was no way to associate the student with the test he had other than the ID number coded on the answer sheet.

When the exam was finished it was graded by hand using a grading mask. The proctor then had to calculate the score. The error rate was often over 3% and the average time to admit a student to the center was over 70 seconds.

Since the service processes over 250,000 tests annually, this added up to a lot of wasted time. In addition, the tests that were hand-graded had to be scanned anyway for the progress reports maintained by the 360.

Mini Connected to Scanner

The service sought a way to reduce the time needed for batch processing, to reduce admittance time to the modular center and to eliminate the hand scoring with all its attendant problems. These goals were accomplished through the use of a Monarch Codabar system, a dedicated Microdata Reality minicomputer and Opscan 17 optical scanners connected directly to the computer.

For batch scoring, information is now entered on a CRT terminal, the tests are scanned and results printed; the entire process takes about one hour. In addition, scoring options have been expanded and improved with the new system.

Improvements at the modular center have also been achieved. When a student comes to the center he presents his ID card and requests a test. The proctor scans the codabar label on the student's ID card using a Monarch 2246 linear barcode reader. The Reality system checks the student's file for various information, such as whether there is a financial hold on the record or an important message from home.

The proctor pulls the appropriate test booklet out of a file. The booklet also has a Codabar label on it which identifies it to the computer. This label is scanned.

The minicomputer then checks to see if the test can be taken at this time, if there is a charge for taking it, if the student has taken this test or this form of the test before, etc. After any discrepancies are eliminated, the proctor gets an answer sheet.

The answer sheet has a Codabar number and a matching Opscan number on it. The proctor scans the Codabar portion and the student is admitted to the testing room. The average time for this admittance process is 20 seconds. After the student completes the test he hands it to another proctor who places the answer sheet in the scanner, which in turn sends the data to the Reality system.

The proper class and test file is then found and the student's file is found through the use of the answer sheet number. The test is scored and the student's records are updated with a full report printed for the student. Optionally, the missed questions and the correct answers may be printed for the student.

A professor may at any time request a listing of his classes' progress.

Rossetti is a former programmer analyst with the Testing Services, McKay Institute, Brigham Young University in Provo, Utah.

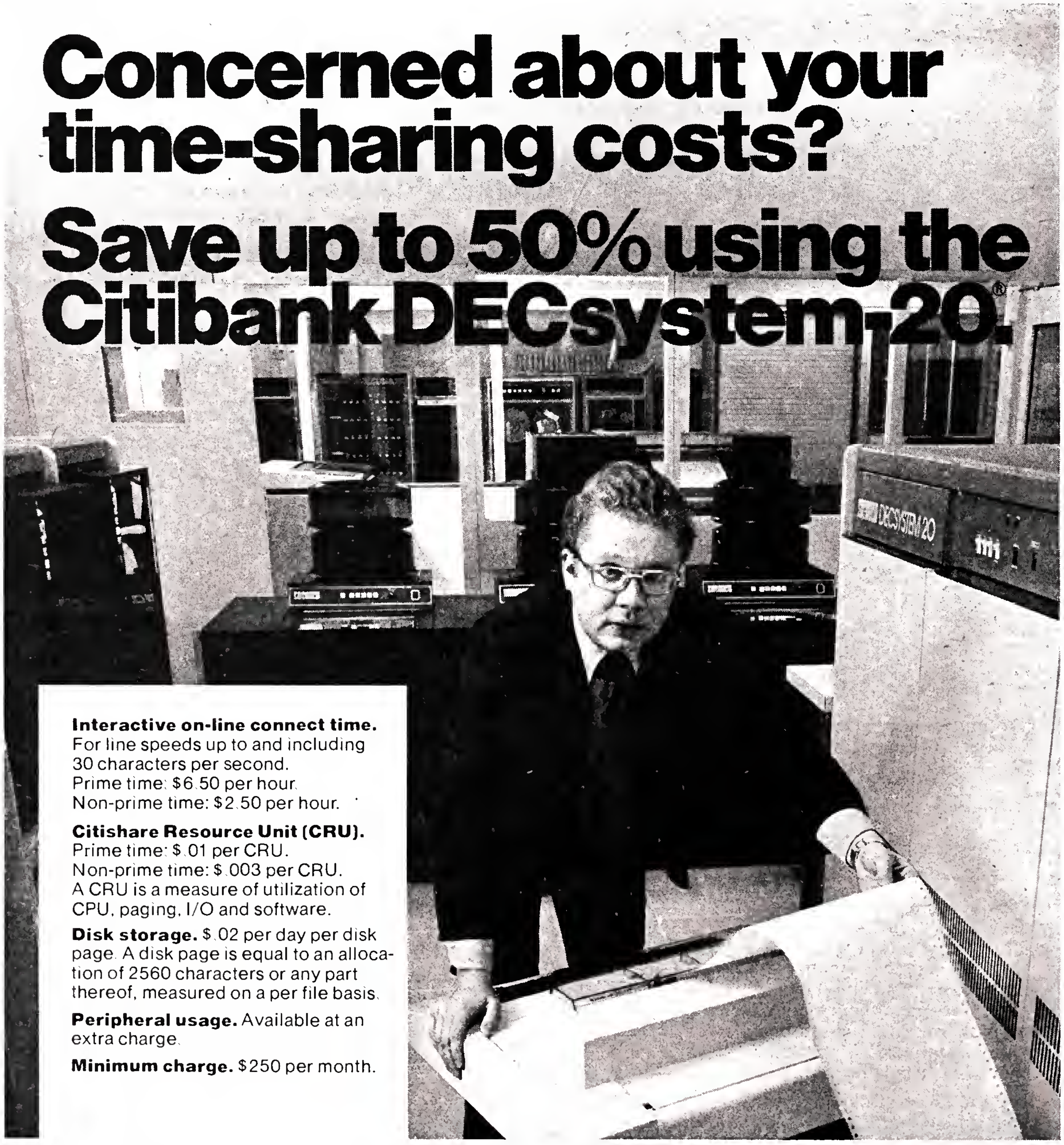
Dicom Extends Disk Line

SUNNYVALE, Calif. — The Model 423 diskette drive features a maximum track access time that is less than 100 msec, according to its vendor, Dicom Industries, Inc.

The unit, which can be interfaced to both the Hewlett-Packard Series 21 minicomputers and the Digital Equipment Corp. PDP-8/E, fits in a standard 19-in. rack and comes with power supply, controller and supervisory status panel, Dicom said.

A basic dual-diskette drive module accommodates two diskettes with a separate head for each diskette. The Model 423 is available in one or two dual-diskette drive module configurations, according to a spokesman.

A system with two diskettes costs $3,800; with four diskettes, it costs $5,050, he said from 715 N. Pastoria Ave., Sunnyvale, Calif. 94086.



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Small Health Care Groups Need Simple, Cheap Systems

By Eugene T. Harrison III
Special to Computerworld

Recent trends in the use of computers in patient care management have been directed toward the development of large, integrated, unified, on-line data base hospital information systems. These systems typically require very large computers with extensive networks of cabling serving its outlying user terminals.

These "Cadillacs" of computing are spoken of in terms of 348K, 500K and even megabytes of core, hundred megabytes of disk, nanosecond processing speeds, not to mention the "megabucks" required to obtain, feed and support them.

But can everyone in health care afford to have a "Cadillac" of his own or even to enter a shared system of this nature?

Like his X-ray machine or his electrocardiograph, the physician needs a relatively simple, basic, no-frills, affordable piece of equipment that can be placed in his office or clinic, that can be easily understood, that relates specifically to his needs and that can be operated by his clerical and paramedical support personnel.

In June 1974, the Medical College of Georgia began a pilot project in response to a request from the Chief of Orthopedic Surgery, Dr. Floyd Bliven, for assistance in developing an inexpensive and responsive dedicated patient interview system whereby questions could be processed and an immediate narrative summary could be produced while the patient was still in the office.

Numerous vendor systems were explored and the general equipment requirements were narrowed down to a programmable stand-alone system with a dual tape cassette capacity. Further evaluation led to the Wang 2200 series systems.

But was it easily programmable? Could we develop the required software in a reasonable time? Would the resultant hardware/software operate efficiently so as to meet our objective of instantaneously producing the narrative response summary?

Demo Equipment Loaned

To answer these questions, the sales demonstration equipment was loaned to us for one week. At the end of the week we were able to demonstrate not only the nucleus of a questionnaire processor and narrative response summary system, but also an elementary automated patient record system.

On January 20, 1975 we initiated a short-term project to develop an orthopedic clinic data system with the following specific objectives:

- Provide a means of developing some immediate experience, exposure and knowledge in defining and using on-line patient medical data.
- Experiment, test and evaluate suitability of an automated patient summary as a supplement to the physical medical record and a document to place in the medical record.
- Provide insight into the medical effectiveness and cost-effectiveness of a small-scale on-line patient medical data system.
- Provide a usable real system whereby the medical staff can gain exposure to an on-line patient medical application.
- Evaluate and establish appropriate guidelines for computerization of patient medical data.
- Evaluate the appropriateness of distributed computing as an approach to some Medical College of Georgia clinical information needs.
- Determine types of data and data sizes for initial input of information about a new patient.
- Determine what data and data sizes need to be captured in subsequent patient encounters.
- Experiment, test, evaluate and finalize the types of questions to use and their maximum sizes, the maximum size of a questionnaire set and the size structure of the paraphrasing for efficient processing.
- Determine the logical maximum patient population and data that could be maintained as active on-line information.
- Experiment, test and evaluate various programs and organization and processing routines with regard to their effects on questionnaire size, processing speed and paraphrasing technique.
- Determine and evaluate what single and multiple search parameters should be provided.
- Propose how inactive patient data could be removed from active on-line files for storage and later reactivation or use in data search and retrieval operations.

The slightly enhanced Wang 2200 configuration we selected included a Wang 2200C-3 CPU with 12K of core, triple removable flexible disk drive and 80-column, 100 char./sec line printer.

On June 4, 1975, we moved the system into the orthopedic clinic, trained several members of the secretarial and clerical staff and placed the system in operation.

Harrison is manager of clinical information systems development, division of systems and computer services, at the Medical College of Georgia in Augusta. This article was excerpted from a paper given at the Wang Laboratories Society for Wang Applications and Programs user society conference in October.

Rolm Ruggedizes 1603; ATR Chassis Holds 32K

CUPERTINO, Calif. — Rolm Corp. has announced a ruggedized version of its Model 1603 minicomputer that can accommodate 32K words of core memory in one Airline Transport Radio (ATR) chassis.

The 1603A was designed to meet MIL-E-5400 and MIL-E-16400 environmental specifications and has six I/O interface slots. The unit also includes a real-time clock and two memory option slots for semiconductor read-only memory, the firm said.

The Model 1603A costs $9,500 with 16K and $15,500 with 32K of core memory including software support and training, Rolm said from 18922 Forge Drive, Cupertino, Calif. 95014.

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CRT, Light Pen Give Utility Engineers Hands-On Feel

By Esther Surden
Of the CW Staff

NEWARK, N.J. — An interactive turnkey minicomputer system at Public Service Electric and Gas Co. (PSE&G) here is helping this utility plan electrical networks while cutting down on the time and personnel needed to perform such work.

The object is "to make sure we provide reliable service," according to Harry Roman, lead engineer. Part of supplying such service is exploring ways changing electrical network configurations will affect users, he said.

The planning phase is critical, Roman noted, because only with accurate planning will the right amount of power be available at the right time.

Prior to the installation of the System 150 from Information Displays, Inc. of Elmsford, N.Y., the firm used a batch method for determining the networks.

The batch method lacked the "hands-on" approach of the old analog system, Bill Michaelson, manager of electric planning, said. The analog plug boards were slow and time consuming but they did give the engineer working with them "a feel for what he was doing," he explained. When digital systems came along that feeling was lost.

PSE&G went to the batch method in the early 1960s, but "punching cards was not the same thing as actually plugging in a circuit," Michaelson said. Some of the "feeling" for the job was retained because in the early days engineers had to punch their own cards, but even that came to an end with modernization. "You filled out a data sheet and others ran them," and the turnaround time could be anywhere from two hours to overnight, he added.

"We determined that we wanted a system that would give us the feel of plugging in the circuits combined with the speed and interactive capabilities of digital systems," he said.

CRT-Pen Fills Bill

After asking various companies how this goal could be achieved, the utility determined that an interactive system with a CRT-light pen combination would best suit its purposes. A minicomputer was also needed for processing and to interface with the firm's mainframe system, a Univac 1110.

"We wanted it to tie into the mainframe because the solution programs were already available for the mainframe. We wanted to use the existing programs," Michaelson said.

"By using a light pen to modify system diagrams shown on a CRT, engineers get swift and sure data input for planning studies," Roman said. The results appear in visual form reducing paper output, he noted, but a hard copy is available if the engineer needs one.

After the planner draws a network of lines and buses on the CRT screen, specific circuit elements from an array of graphic symbols are selected with the light pen. The element is then entered at a desired line or bus in the circuit diagram.

"Another command from the light pen transmits the load flow case data on the CRT over a telephone grade link to the mainframe computer for solution after-graphical error checks," Roman said.

Should Pay For Itself

The system should pay for itself in two years, he said. The time savings over the batch method has been estimated at anywhere from 10 to 1 to 70 to 1, he added.

The savings in time has been determined in total turnaround, Michaelson added. "In one situation a substation caught on fire. We solved the problem in three hours instead of three days as a result of using the interactive system," he said.

The utility has also experienced savings in personnel. The personnel can now be more productive; instead of having to wait for results, the engineers get immediate feedback and can then revise their work. Thus the system has saved the company from having to hire more engineers as the network became more complex.

Increased accuracy has been another benefit, Michaelson added. The kinds of transpositions and other clerical errors that used to occur with the batch system no longer do, he stated.

Mini-Based Monitor Helps Cut Consumption, Waste of Energy

LOUISVILLE, Ky. — Lost energy is one expense that Chemetron Corp.'s Tube Turns division is attempting to curtail by using a minicomputer-based energy management system.

Tube Turns has brought electrical demand under tight control by putting an IBM System/7 to work monitoring electricity used on a second-by-second basis.

The division, with a total electrical power requirement of 1.5 million kW a month, is currently monitoring 600 kW a month and is aiming for 1,600 kW a month or a saving of $18,000 per year.

In monitoring the energy consumption of equipment, the System/7 is programmed to turn certain machinery off when it is not needed and on when it is.

The division has three goals in measuring electrical demand and usage: how it affects production levels, how it affects employee comfort and does it create a safety factor, according to D.R. Wyborny, vice-president, manufacturing.

Computer as Controller

Computers are currently controlling main plant air compressors; a snow melting system in front of the main office; exhaust fans; air conditioning compressors in the main office, engineering and cafeteria; hot water heaters, lighting and even the dishwasher in the cafeteria.

"Each minute the system studies the electrical demand and if a need arises for a piece of equipment to be shut down, the computer is capable of shutting it down," J.P. Hendrick, director of facilities engineering, said.

If, for example, thermostats rise above a preestablished setting of 75 degrees in the summer, the system will allow the air conditioning to operate for 12 minutes and shut it down for three minutes rather than allowing the system to operate 10 minutes on and five minutes off. If necessary the system can be manually overridden.

"The mini can also act as a watchdog over forgetful people. If, for example, someone allows a machine to remain on over a weekend, the computer could catch the oversight and turn the machine off," Hendrick explained.

Tube Turns also gets a side benefit with computer monitoring: results can be compared with the utility company's billing to check for any possible errors.

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Series/1 Seen Guarantee of Distributed Dominance

PALO ALTO, Calif.— IBM's announcement of the Series/1 minicomputer last November may have been the most significant computer product announcement since the firm announced the 360 series in April 1964, according to a report from Small Business Systems.

The 360 was significant "because it was the first family of general-purpose computers and enabled IBM to attain worldwide dominance of the general-purpose computer market.

"The Series/1 is significant because it will ensure IBM future dominance in distributed processing and set the stage for the next generation of general-purpose systems," the publisher of "Small Business Systems Industry Report" stated.

Noting that the Series/1 is a departure from IBM's traditional modus operandi, the report — "IBM Series/1 — Impact and Opportunity" — said IBM's approach will have a definite effect on others in the industry.

The Series/1 is truly an unbundled system in terms of both software and hardware. It is also a "purchase-only" item, a policy IBM tried with the 5100 but which it may maintain with the Series/1 to ensure the stability of the distributed processing base which it will be creating, the report predicted.

"By unbundling the Series/1, substantial opportunities will be available for equipment manufacturers and software houses to sell their wares into the Series/1 market," the report observed. "IBM has opened a market window for these other companies, but that window is capable of being closed quickly upon the slow and conservative."

Target Market

The marketing target IBM has selected for the Series/1 is the largest corporations, both domestic and international, who have the sophisticatin to develop their own systems given the Series/1's capabilities,the report noted, adding it has been said 80% of IBM's computer revenues come from 200 corporations.

"IBM's strategy is obviously intended to protect and enhance that revenue source," it contended.

Many of these corporations are multinational and have factories, warehouses and offices around the world as well as in remote domestic locations. The large service organization which IBM can bring to those remote locations makes it the logical choice over the other vendors, the report concluded.

As the number of nodes in a distributed network increases, so will the demands on the host processor and telecommunications facilities, eventually justifying an upgrade to the next generation of equipment, it continued.

"As telecommunications increases, the business opportunities for Satellite Business Systems, of which IBM is a partner, will be in-

(Continued on Page 54)

Five-Year Forecast Released

Adds, Racal Continue Milgo Wooing

By Toni Wiseman
Of the CW Staff

MIAMI — Applied Digital Data Systems, Inc. (Adds) has taken steps to initiate its previously announced offer to exchange stock for Milgo Electronic Corp. shares.

Countering this move, however, Racal Electronics Ltd. has offered to buy all Milgo stock.

Meanwhile, trading of Milgo stock on the New York Stock Exchange has been suspended at Milgo's request.

Racal had previously offered to buy 312,000 shraes of Milgo stock at $21.50 per share. The new offer sets the price at $26 per share for any and all Milgo stock, according to a Milgo spokesman.

All but one Milgo director have agreed to sell their holdings to Racal; the seventh director has not yet decided, he said.

Milgo and Racal jointly own a firm which distributes Milgo's products abroad.

The Adds offer, opposed by Milgo's management, is to exchange one new preferred Adds share for each outstanding Milgo share. The offer will expire Feb. 4 unless extended and is still subject to approval of Adds shareholders.

Each Adds preferred share would be convertible into 1.5 common shares after one year, carry a $1 annual cumulative dividend, have a $25 preference if the firm were liquidated and could be called at $25 after 13 months.

Projections Made Public

Earlier this month Milgo made a public disclosure of its confidential projections of profit and sales for the next four years.

This information had previously been disclosed to Racal as well as to Adds in court. Milgo therefore decided its shareholders should also have the pertinent data and released the report, according to the Milgo spokesman.

Milgo also enclosed a disclaimer of the information contained in the report. Signed by Milgo's vice-president of finance, Charles C. Weston, the letter stated that "no representation is made that the future revenues, earnings or balance sheets of Milgo will be as stated in the August 1976 forecast.

"The August 1976 forecast was not intended to be and is not a forecast prepared for public dissemination as a guide to Milgo's future operations and cannot be relied upon for that purpose," Weston wrote.

Along with the warnings of "inherent unreliability," the forecast included four pages of tables showing revenues, costs, profit

(Continued on Page 50)

Revenue, Market Called Calcomp Suit Issues

By Molly Upton
Of the CW Staff

LOS ANGELES — California Computer Products, Inc.'s (Calcomp) damage claims against IBM in its $102 million antitrust suit fall into two categories: reduced revenue on installed disk equipment and deprived market, according to the testimony of Calcomp Chairman Lester Kilpatrick.

Explaining how Calcomp computed its damages, Kilpatrick said the damages claimed by Calcomp resulted from IBM's introduction of its 2319A and B, the Fixed Term Plan (FTP), the Extended Term Plan (ETP) and the integration of the controller in the 370/158 and 168.

The Calcomp products which suffered from these announcements were its versions of the IBM 2311, 2314 and 3330, he stated.

The reduced or lost revenues on actual installations were bundled system in terms of both 26,000 Calcomp disk drives and controllers shipped to end users of IBM equipment between Jan. 1, 1974 and June 30, 1976, he added.

Kilpatrick emphasized this claim excludes other factors such as competition from other plug-compatible manufacturers and the age of Calcomp equipment.

The reduced revenue damages were calculated by subtracting Calcomp's list price after FTP from the prices at which Calcomp sold its equipment prior to IBM's actions, he explained.

These calculations were conservative since Calcomp's actual prices after FTP were often lower than its list prices, he said.

Kilpatrick indicated the second category of damage — deprived market — involves judgment. It represents the profits Calcomp says it would have made on units it would have shipped but did not because of IBM actions and their effects on the marketplace.

In explaining why the IBM actions hurt Calcomp, Kilpatrick said the December 1970 announcement of the 2319A had a small effect on Calcomp; IBM had not begun to deliver the 145 to which the repackaged 2314s would attach. However, it was a "harbinger" of things to come, he added.

The 2319B announcement on

(Continued on Page 50)

IBM Incognito?

LOS ANGELES — Among the more than 50 observers recently in the courtroom here where the trial of California Computer Products, Inc. (Calcomp) vs. IBM is being held were about five IBMers appearing "incognito."

Dressed in casual clothes such as polo shirts, leisure suits, corduroys and desert boots, these men were identified by a Calcomp employee as IBM personnel "out of uniform."

The men sat in on Calcomp Chairman Lester Kilpatrick's deposition, supplying the IBM attorneys with questions pertaining to their particular areas of expertise such as marketing and technical aspects, according to the Calcomp employee, who was also present at Kilpatrick's deposition.

One IBMer confessed it was his day off, but some observers suspected the men were told to come more or less incognito to avoid making the courtroom look like it was packed by IBM.

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Lost Revenues, Market Called Issues in Calcomp vs. IBM Suit

(Continued from Page 49)

May 27, 1971, with the less expensive, repackaged 2314s available to 360s, was very significant to Calcomp, he said. It forced Calcomp to lower prices and reduce its margins, if any, and "cry in our beer," he recalled.

FTP Damage

The FTP, which provided an 8% or 16% price cut to those IBM users who signed up for one- and two-year leases respectively, also hurt Calcomp, Kilpatrick said. FTP provided a very small amount of time in which to sign these users, forcing Calcomp to lower its prices and locking it out of accounts, he said.

The ETP continued the lockout, he added. Also, a Calcomp finance arrangement fell through after the FTP was announced.

The August 1974 announcement of the 370/158 and 168 included the incorporation of the controller in the CPU via the Integrated Storage Controller (ISC).

This either locked Calcomp out of these markets or forced it to lower its price on its 3330-type device, he stated.

Kilpatrick estimated IBM gained a cost saving between 10% and 20% from this device, but reduced the price for the controller function by about half.

Long an outspoken critic about the effects of IBM acts on plug-compatible peripherals makers, Kilpatrick was very soft-spoken on the stand but voluble in answering Calcomp attorney Max Blecher's questions.

In several instances, Blecher reminded his client he wanted a brief answer, preferably "yes" or "no."

Judge Ray McNichols told Blecher he should feel no compunction to finish his direct inquiry by the end of the day because he might think of more questions overnight to ask the 53-year-old chairman and one of the founders of the plotter and disk and tape drive firm.

How Kilpatrick will behave on cross-examination remains to be seen. At the conclusion of the day, attorneys for both sides were seen grinning broadly, so both sides think Kilpatrick scored points for them.

Kilpatrick traced his origins as well as the founding of Calcomp, which operated out of a garage for a time, thus attempting to provide to the jury an image of Calcomp as a company of humble origins comprised of real people, not an anonymous corporate monolith, according to trial observers.

Adds, Racal Continue To Woo Milgo Shares

(Continued from Page 49)

and balance sheet items projected until 1980.

Milgo's revenues, for instance, were forecast to grow from $39.8 million in 1976 to $52.7 million in 1977, $61.6 million in 1978, $74 million in 1979 and $85.4 million in 1980.

The forecast showed earnings leaping from $1.8 million in 1976 to $11.5 million by 1980.

The forecast was further broken down into sales by product group and by domestic and foreign operations.

Total revenues from modem sales were forecast to grow from $21.7 million in 1976 to $26.2 million in 1977 and $34.2 million by 1980.

The 40+ terminal as a product would bring in only $100,000 in 1976, but its revenues would grow to $2.1 million in 1977, $4.5 million in 1978 and $11 million in 1980, the forecast showed.

Firm Gives Foreign Leads

BOSTON — International Information Corp. has been formed here to provide smaller manufacturers and distributors with weekly lists of product inquiries and bid requests from foreign governments and firms.

Industrial, commercial and consumer product inquiries are obtained from banking, government and trade sources, according to Robert Flynn, president. Leads are compiled into one list, indexed by product heading and sent to subcribers weekly.

Each notice includes a description of the product required, quantities, specifications, bid deadlines, the person to contact and other pertinent data.

Free literature provided with the service discusses export sales letters, pricing, payment and shipping methods and gives hints to help smaller firms start or expand export sales, Flynn said.

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3M COMPANY

CDC Launches Seminar Series on Soviet Technology

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C.— Control Data Corp. has entered the escort business. Through the beginning of February, the corporation is squiring Soviet scientists and engineers to three U.S. cities, introducing them to American companies through seminars on technologies developed in the USSR.

Designed to provide U.S. firms "with an understanding of business opportunities to be found in applications of Soviet-developed technology," this first series of three-day seminars, entitled "Process Control Technologies in the Soviet Union," has been held in Pittsburgh and Houston and will take place this week in San Francisco.

The introduction of new technologies will mean new businesses and more jobs to the U.S., according to William C. Norris, CDC chairman of the board.

But the Soviets, too, stand to gain from the exchange, he said. "There is a high priority in the Soviet Union on finding Western partners to develop commercial applications for Soviet laboratory research," he explained.

No Gain for CDC

"I don't think CDC will gain anything special" by hosting these meetings, the CDC official said. "We're in the business of transferring technology. We hope that will be profitable."

CDC shipped a Cyber 73 to the Soviet Union about six weeks ago and is negotiating to send further systems, Norris stated.

Rather than plugging mainframes, however, the seminars seemed an appropriate marketing vehicle for Technotec and Worldtech, twin computer-based, worldwide communications and technology exchange services formally announced by CDC a year ago and referred to by Norris in connection with the seminars.

Norris used a Washington press conference to stress the American need for Soviet technology. Jobs are the key reason for looking to the USSR for new ideas, he suggested.

"If we are to reduce our current 7.9% unemployment to an acceptable 4% by 1985, we must create some 72,000 jobs each week over the next decade. We cannot create these jobs unless we develop the new industries that spawn new jobs," Norris said.

New jobs are dependent on technical innovation, he added, but U.S. research and development has slowed considerably in recent years.

"A vast amount" of technology is being developed outside the U.S., Norris noted, commenting that the "total research and engineering effort in the Soviet Union is larger than that in the U.S."

Low Soviet Profile

There are 5,500 Soviet research institutes with an average employment of 800 each and a total annual budget in the neighborhod of $17 billion, according to Norris.

The intent of the CDC-sponsored seminars is to help eliminate "the tendency here in the U.S. to deprecate the quality of Soviet technology," he said.

The way in which Soviet R&D is organized and conducted causes its results to have a low profile, he suggested.

"Hence, most Soviet research results are not highly visible, making it more difficult to identify commercial applications and in turn to assign specific commercial values.

"As a result, U.S. industry for the most part is making superficial evaluations and is misjudging the potential of Soviet technology," Norris said.

"U.S. companies should take a page from the Japanese book on how to use other countries' technology," he added in arguing for a less restrictive U.S. policy on trade of nonstrategic goods between East and West.

Norris stressed that the technologies that will be discussed at the seminars are "nonstrategic" and "of a nature that need not alarm anyone concerned with our national security." CDC's program has the blessing of the U.S. departments of state and commerce, he added.

Technical cooperation with the Soviet Union is already producing significant benefits, he maintained, citing some 20 licenses U.S. companies have obtained in recent years to use Soviet technology.

The Soviets are conducting the seminars conference-style in Russian with simultaneous English translation. Professors Boris Timofeev and Georgij Iordan and Dr. Boleslav Volter are scientists responsible for the process control systems used in modern Soviet chemical and metallurgical plants.

CDC has received approval to sponsor four additional seminars in 1977. Their topics include "Higher Education Systems and Programs in the Soviet Union" (March); "State-of-the-Art Welding Technology and the Associated Equipment Developed in the USSR" (April); "Hydrometeorology: The Study of Atmospheric Water Vapor" (June); and "The Use of Econometric Models for Forecasting and Planning in the USSR on the National, Branch and Regional Levels" (October).

International News

Japan Hopes to Sell Three CPUs to China

TOKYO — The Japanese government will approach the Carter Administration for support in its quest to gain approval from the Coordinating Committee for Export Control (Cocom) for its planned export of three computers to China, according to a report in the *Journal of Commerce*.

The computers, manufactured by Hitachi, will be the first such Japanese export to China.

"Since the computers which the Chinese plan to buy from Japan boast such technical capabilities that they could be used for strategic purposes by Peking, it is considered possible that Cocom might reject the sale," the newspaper said.

Chinese officials have stated, however, that the two Hitachi M-160s and an M-170 will be used for meteorological purposes only.

The Japanese representatives will argue in Washington that the Ford Administration already has conditionally approved the export of two Control Data Corp. Cyber 172s to Peking for earthquake detection and oil exploration, the report predicted.

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French Rail to Swap Central Net For Packet-Switching System

By Ivan Berenyi
Special to Computerworld

The French railway, SNCF, which has been rationalizing its computer operations for several years, now plans to replace its centralized data communications network with a distributed packet-switching system.

The network, scheduled to go live in mid-1979, will be based on some 150 minicomputers, 22 of them replacing a 2 by 2 Univac 1110 system as the network controllers and the remainder taking over from 100 aging Honeywell DDP 316s as regional concentrators.

"We have yet to define the exact functions of the new machines, but we will be making use of the opportunity to extend the capabilities of the concentrators, adding more memory," Henri Dreyfus, computer director said. "We aim to exploit advances in technology to upgrade the whole network."

Contracts for the hardware, which are likely to come from a single supplier, will be put out for bidding early in 1977.

The network will initially take over only the seat reservations communications. Other telecommunications applications will be transferred gradually from the rented 1110 complex, which will be phased out over 18 months.

Order Being Placed

SNCF will also be placing orders during 1977 for up to 100 models of a new on-line reservations-plus-ticket-printing terminal, which will be used solely for seats on the railway's 160 mph superexpress Paris-Lyons service, due to start in 1981-82.

The terminal will be linked into the reservation system and will be able to accept payment in banknotes and give change.

This terminal is, in fact, the forerunner of a more-ambitious multipurpose terminal (hardware orders for both types are to be placed in 1977) which SNCF is developing to replace the assortment of dedicated, and mostly elderly, Olivetti and IBM terminals now linked to its various teleprocessing systems.

The railway's own engineers have built a prototype of the new terminal — an intelligent unit incorporating disk, printer and display, all controlled by a microprocessor.

Japanese Expected to Gain Greater Share of Market

NEW YORK — The Japanese computer industry has about 5% of the world computer market; however, the latest statistics released by Miti give clear evidence that the Japanese are likely to gain greater market share in coming years, according to Drexel Burnham & Co., a security analyst firm.

Drexel Burnham recently issued a report on the status of the five Japanese leaders and their rising backlogs.

Fujitsu, which has the largest share of the DP market in Japan, realizes about 75% of its revenues from the sale of DP products, the report said.

Fujitsu's computer-unit backlog rose from 52 on March 31, 1976 to 60 on June 30 and 76 on Sept. 30. It consists of M Series computers: the 190, 180 II and 160, jointly developed with Hitachi.

Fujitsu helped finance Amdahl Corp. and is aiding in the manufacture of Amdahl computers, the report noted. The two firms recently formed a joint venture to market computers in Europe.

"Hitachi is much bigger than Fujitsu, but has not been so aggressive in marketing computers, perhaps because data processing accounts for only about 11% of total corporate revenues," Drexel Burnham said, noting the firm's DP revenues come almost equally from outright sales and rentals.

Backlogs rose from 57 units on March 31, 1976 to 129 units on Sept. 30, including 70 M-160 IIs; 50 M-17s and 9 M-180s.

Although Hitachi and Fujitsu jointly developed the M-Series, they manufacture and market separately.

The Nippon Electric Co. (NEC)/Toshiba group cooperates in all phases of computer activity from research to marketing. NEC generates some 22% of its revenues from DP compared with 7% for Toshiba.

From March 31, 1970 to Sept. 30, backlogs rose from 329 to 504 for NEC and from 130 to 163 for Toshiba.

Mitsubishi Electric "intends to increase its data processing revenues from 5% to 10% of total revenues by 1980," the report revealed, adding the company expects its computer business to be profitable within two years.

Backlogs for its Cosmo 300, 500, 700 and 900 have increased from 60 to 83 between March 31, 1976 and Sept. 30.

Foreign Orders & Installations

Oji Paper Co. Ltd. of Japan has ordered a Measurex Corp. 2000 digital computer process control system.

***Il Secolo XIX*, an Italian newspaper, has ordered a Mergenthaler Linotype Co. System V to be used for inputting and processing editorial and advertising material from four remote offices.**

The North-West Savings Bank at Rouen, France, has ordered a 192K NCR Criterion 8550 as part of a twin computer center which will also include an NCR Century 251.

The UK's Southern Electricity Board has installed a 2970 system from International Computers Ltd.

A Danish discount store, Bilka, has ordered an NCR checkout system to incude 40 to 48 NCR 255 checkout terminals and twin NCR 726 in-store minicomputers.

The National Hospital in Tokyo is installing a Neuro CAT Scanner system from Kanematsu Electronics Ltd., Artronix' Japanese distributor, for evaluation and approval by Japanese authorities.

Brabantia B.V., a Dutch household appliance manufacturer, is installing an on-line inventory control system including a Burroughs Corp. B1726 system, three B80 systms, two TC4000 terminal systems and 10 TD700 and TD800 input and display systems.

Companhia Paranaense de Energia Electrica (Copel), a Brazilian electric power utility serving the state of Parana, has ordered a Microplex control system from the controls division of Harris Corp. valued at $3.4 million. Dual Slash/4 computers at the central complex will interact with more than 70 remote control installations across the state.

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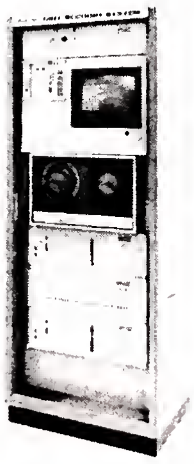

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WANG

One of 'San Jose Seven' Told To Redraft Charges Against IBM

By Molly Upton
Of the CW Staff

LOS ANGELES — Federal Judge Francis C. Whalen did not dismiss a $250 million civil rights suit filed by Wolfgang Arnold against IBM, but instead gave Arnold's attorney 30 days in which to redraft the "unintelligible" seven-count complaint.

An IBM spokesman said the judge's remarks were "more than adequate" when asked IBM's comment on the suit.

Whalen denied IBM's motions to move the case closer to Santa Clara County and to dismiss the case because its charges did not constitute a civil rights case.

Arnold was one of the "San Jose Seven" arrested by police June 29, 1973 on charges of theft of trade secrets brought by IBM [CW, April 17, 1974].

IBM's case against Arnold was dismissed on April 3, 1974 because the information on which the search warrant was issued was later deemed to have been too old and testimony indicated the district attorney's office had been misled in issuing the warrant, according to Arnold's attorney, Richard DeSantis.

Arnold countered with a suit against IBM charging violation of civil rights. Whalen struck the seventh charge against IBM and told DeSantis to condense the other six complaints.

According to the complaint, IBM "knowingly, maliciously, willfully and arbitrarily in bad faith and negligently filed false reports of theft of IBM trade secrets" with police.

In addition, Arnold was held by police for six hours without bail while police, at the behest of IBM, delayed in obtaining an arrest warrant, the suit alleged.

IBM in the meantime arranged with police to review documents at Computer Disc Mastertape (CDM), Arnold's employer, according to the complaint. The police were flown to Los Angeles from the San Jose area in IBM's Lear jet, DeSantis said.

Furthermore, IBM acted to intimidate small companies such as CDM from supplying parts to its competitors through such means as obtaining search warrants, the complaint alleged.

IBM also presented false information to the grand jury, which handed down an indictment, it continued.

Along with IBM, the suit names as defendants 10 individuals, including IBM's assistant general counsel.

DeSantis said Arnold was unaware of the presence of drawings found by police during the search at his residence. These were later ruled to be IBM's property.

DeSantis claimed Arnold was "induced" to move into this house shortly before the raid. The house was formerly occupied by Wes Powers who, although named in IBM's search warrants, was never found and was believed to have been out of the country.

When asked whether Arnold has filed a trade secret theft charge against IBM for its access to documents at CDM, DeSantis replied, "Not yet."

DeSantis explained the suit could not charge malicious prosecution because there had been an indictment in the case.

Arnold delayed in bringing this case, DeSantis said, because he was lacking in funds following the brush with IBM and police. Evidentiary material is stronger now because of what has come to light in some of the antitrust cases, he added.

Mini To Guarantee IBM Market Control

(Continued from Page 49)

creased substantially.

"These large corporations will be purchasing between 20 and 100 Series/1 subsystems each. Assuming an average price of $50,000, this means each order will be worth between $1 million and $5 million.

"With an average of 60 Series/1s per corporation distributed among the top 1,000 corporations, Small Business Systems is forecasting some 60,000 Series/1 annual shipments at year-end 1983 worldwide. This represents some $4.3 billion in revenue to IBM over the next five years and some $1.1 billion in pretax profit," the report stated.

While the system's technology is not new or dramatic, the industry must consider the wealth of peripherals which the Series/1 will support, the report observed.

In addition, although only two "primitive" software packages were initially offered, the industry can expect to see a variety of packages becoming available from IBM, Series/1 users and software houses, Small Business Systems predicted.

The report will be available in March from the publisher at Suite 1119, 701 Welch Road, Palo Alto, Calif. 94304.

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Plans Increased Spending

DP Growing in Small Systems

SOUTHBORO, Mass. – Data General Corp. (DG) is experiencing continued growth in its small computer systems business and plans increased capital expenditures this year, according to President Edson D. de Castro.

Addressing the Annual Meeting of shareholders recently, de Castro stated "incoming orders continue to show growth over 1976 and our shipments during the quarter reflected this."

DG recently reported fiscal 1977 first-period sales of $47 million, up 62% over the same period a year ago.

"Due to the expansion in manufacturing capacity that occurred during 1976, we have been able to ship products at a rate more consistent with orders," de Castro said.

"As a result, our leadtimes have remained relatively constant in the 30- to 90-day range.

"We consider this balance appropriate for our customers and an effective way of managing our resources," he added.

In 1976, DG undertook its first major acquisition with plans to acquire Digital Computer Controls.

"We believe there are several advantages to the merger," de Castro told stockholders.

"DCC serves an active group of OEM customers with products that are largely complementary to DG's.

"It is a healthy and profitable company, with operating margins currently almost those of Data General. And, the merger would remove several outstanding litigations of long standing between the two companies," he said.

Products

DG observed a number of marketplace trends in 1976 including a variety of small computer applications, a growing group of mature and sophisticated end-user customers, increasing preference of all customers to purchase as complete a system as possible from a single vendor and the growth of distributed DP.

"DG benefited from these trends in the marketplace," de Castro said, "and I believe we will

"A major reason for our confidence is the rapid pace of new products we are introducing to satisfy these needs.

"In 1976, we introduced one new product about every 15 working days. They fall into three major areas – central processors, peripheral equipment and software.

"In several cases," de Castro continued, "we introduced peripherals of our own design and manufacture. We believe this vertical integration is essential to our future profitability, to our total system's performance and to assure our future sources of supply.

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Vendors Vying for Vacancies

WALTHAM, Mass. – Manufacturers vying for positions in the minicomputer market are moving to shore up or stake out positions in the end-user market, a segment which is expected to grow four times to the $3 billion level during the next five years, according to *EDP/Industry Report* (EDP/IR).

A study by International Data Corp. (IDC) conducted among the top-level DP decision makers, revealed low visibility but large potential for mini makers.

These conclusions emerged from that study, according to EDP/IR:

- "As these large (Fortune 1000-type) organizations increase their mini sophistication, they establish more savvy buying patterns, including centralized buying centers that do comparison shopping and look at what is available, including the possibility of third-party peripherals."
- "Commercial applications will be the mainstay of minicomputer growth. Therefore, software offerings become more important and the market for disk drives associated with minis will increase rapidly."

AT&T Names Brown President

NEW YORK – In a reshuffling of top management at AT&T, Charles D. Brown, a vice-chairman and chief financial officer, has been chosen president and chief operating officer effective April 1.

Executive Corner

Brown will succeed William L. Lindholm, who is retiring.

In his new position, Brown will be responsible for customer services, engineering and network services, marketing and the Long Lines department.

William S. Cashel Jr., an executive vice-president, will replace Brown as vice-chairman, director and chief financial officer.

Other Changes

■ Dan L. McGurk was reappointed to Inforex, Inc.'s board of directors after a one-year absence.

■ Automatic Data Processing, Inc. announced that Alan E. Schwartz has resigned from its board of directors because of a potential conflict of interest.

■ Robert F. Jenkins, chairman of the board and chief executive officer of Bird & Son, Inc. has been elected to the board of directors of the Foxboro Co. and Earle W. Pitt, president, has been elected chairman of the board of directors.

■ Gene Stacey has been named president, chief executive officer and director of the Warrex Computer Corp.

■ George A. Chamberlain III has been named treasurer of Digital Equipment Corp.

■ Kurt Kasper has been appointed European operations director for the Business Systems Division of Pertec Computer Corp.

■ Charles A. Furciniti has been elected vice-president Hazeltine Corp.

■ Robert L. Patton has been promoted to the new position of vice-president of Honeywell's Industrial Products Group International.

■ Paul C. Nee has joined IPL Systems, Inc. in the newly established position of executive vice-president.

■ Roger W. Johnson has been elected executive vice-president and chief operating officer of Measurex Corp.

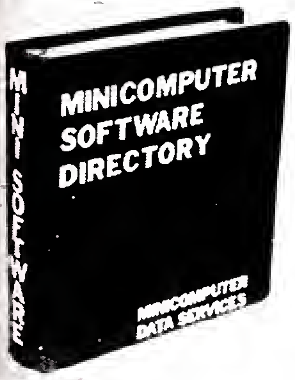
■ James Dobbie and Robert Jaunich II have been appointed vice-president of equipment and vice-president of media respectively at Memorex Corp.

■ Jerome Kornbluth has been named a vice-president of Informatics, Inc.'s PMI Eastern Division.

■ James Bishop has been appointed vice-president of Inforex, Inc., with responsibility for the company's worldwide manufacturing facility in Burlington, Mass.

■ Frederick J. Anderson has been appointed vice-president and general manager of GTE Information Systems, a part of GTE Communications Products Business, a major business group of General Telephone & Electronics Corp.

■ A. Thomas Bassett Jr. has been named vice-president and group executive for Control Data Corp.'s Data Systems Group.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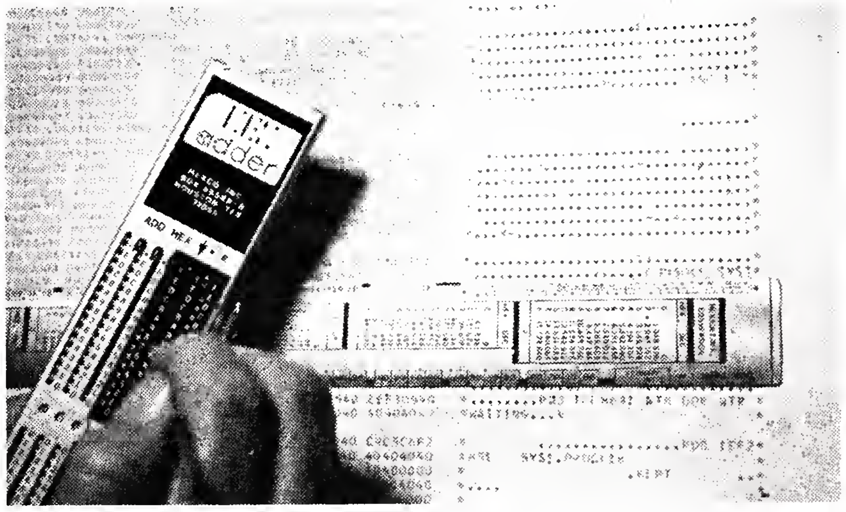

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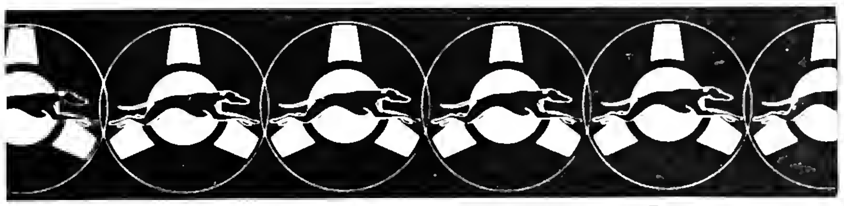
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Financial News

Stock Exchange Member Says DP Still Good Investment

NEW YORK — DP stocks are still a good investment, according to L.F. Rothschild & Co. (LFR), the N.Y. Stock Exchange member whose model portfolio currently has 14% of its assets invested in DP concerns.

This compares with a Standard & Poors 500 weighting of about 10%.

"We believe many DP issues will outperform the market averages over the next nine to 12 months, largely reflecting the favorable relative earnings performance which we believe has already begun and will continue in 1977," an industry review by the firm said.

"During 1976, the shares of most DP companies outperformed the broad market averages. Burroughs, Digital Equipment Corp.and Sperry Rand were the exceptions. Despite its favorable performance for the full year, the group underperformed the averages for the past three to six months," it observed.

For most of the year, firms in the minicomputer market sustained the most dramatic gains, reflecting investor enthusiasm for this group's strong current earnings performance and its favorable positioning for long-term growth, LFR said.

However, the review noted, price weakness late in the year caused minicomputer shares to turn in one of the poorer full-year performances.

"Obviously, certain securities are likely to perform better than others despite our belief that the group is generally undervalued," the review stated.

"Those stocks conceded to be of secondary quality posted the best stock market performance in 1976. NCR's year-to-year 65% advance, along with the 48% gain for Honeywell and 44% for Control Data, were the best.

"IBM also outperformed the Standard & Poor 500 by almost 50% in 1976.

"At this point we continue to believe the best risk/reward profiles are found in the secondary sector of the group, where stocks such as NCR, Honeywell and [Univac] are not only selling at discount to their average [price/earnings ratios], but at discounts to the market generally," LFR said.

Concern Over Multinationals

While multinationals have a good earnings outlook, they appear to be suffering from investor uncertainties regarding foreign economic developments, the review noted.

In addition, product introductions in the past six months may have led investors to conclude that damaging pricing policies are developing in the hardware segments of the business — concerns which have been intensified by the early success of plug-compatible manufacturers such as Amdahl and Intel, it said.

Negative Factor

"Currently, the major negative factor relating to the industry's investment prospects is concern regarding economic developments in foreign countries.

"In our opinion, the currency conversion 'losses' resulting from the general strength of the U.S. dollar in recent years have been far larger than the interim earnings dislocations which could result from lower worldwide economic growth.

"In 1975, about 50% of the group's revenues and a somewhat higher portion of earnings were derived from international markets. These ratios are heavily influenced by IBM's 50%/56% revenue/profit ratio. In some instances, the low end of this range is just short of 40%/40% for minicomputer companies," the review stated.

Year, Quarter Bring Burroughs Records

DETROIT — Burroughs Corp. reported record revenues and earnings for both the fourth quarter and the year.

Revenues from worldwide operations in 1976 rose to $1.9 billion, a 12% increase over 1975 revenues of $1.7 billion. Rental and service revenue increased 23% while outright sale of systems and products increased 5%.

Year earnings totaled $185.9 million, a 13% increase over 1975 earnings of $164.4 million.

Earnings per share increased 12% to $4.62 compared with $4.14 a year ago.

Revenues for the 1976 fourth quarter were $589 million, an increase of 7% over last year's fourth quarter of $552.2 million.

Fourth-quarter earnings rose 19% to $81.9 million from $69.1 million in the last 1975 quarter. Per-share earnings were $2.04 compared with $1.73 in the year-ago quarter.

Burroughs' orders for the year increased 17% over 1975.

DP showed the strongest gain in the equipment area, Burroughs reported, with terminal products registering very strong growth.

Ray W. Macdonald, Burroughs board chairman, commented that 1976 was the most outstanding year in the company's history for product introductions. Led by the 800 family of computer systems, the new products are being enthusiastically received in the market, he said.

Memorex Year Net Up More Than 100%

SANTA CLARA, Calif. — Memorex Corp.'s earnings for 1976 were more than double those of 1975 while fourth-quarter earnings rose almost 100%.

For the quarter ended Dec. 31, earnings rose to $11.6 million or $2.01 a share including a $4.4 million tax credit. This compared with earnings of $5.9 million and a $2.6 million tax credit in the 1975 period.

Fourth-quarter earnings would have been $1.90, however, if dividends on the company's preferred stock had been currently payable at the maximum rate payable after 1980, the firm noted.

Revenues for the quarter climbed to $100 million compared with $69.8 million in the year-ago quarter.

Earnings for fiscal 1976 soared to $40.1 million or $7.01 a share including a $15.2 million tax credit. Fiscal 1975's earnings were $18 million or $3.77 a share including a $5.9 million tax credit.

Year revenues rose to $345 million compared with $264 million in 1975.

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President Cites Proprietary Advantages

Basic/Four Sees Manufacture of Mini as First Step

By Molly Upton
Of the CW Staff

IRVINE, Calif.— Basic/Four's president, Ted Smith, views manufacturing of the firm's own mini as a first step in making a large portion of the system.

By manufacturing its own components, a vendor can incorporate features that help create proprietary advantages, he remarked.

But Smith is not about to plunge into manufacturing for the sake of manufacturing, he said, since there is a buyer's market in the peripherals sector.

After evaluating a number of printers and disk drives and analyzing manufacturing costs, Smith said he was surprised at the low margins on some of these products.

The plan is to sit out this round of technology and see what will emerge as the next prevailing type of technology: 3330 vs. Winchester, for example, he said.

Basic/Four has expanded its hardware engineering and systems programming departments to prepare for future developments, he added.

"We want a three- to five-year plan in which we'll position ourselves to buy a product that has longevity and have the right to manufacture it," Smith said.

As an example, Basic/Four has a license from Lear Siegler, Inc. to make a dumb CRT terminal which it will exercise next year.

Price Erosion Factor

One reason Basic/Four turned to making its own minis instead of continuing to procure them from Microdata Corp. is that with continuing price erosion in the market it is difficult to maintain a reasonable gross margin when one buys a large portion of the system, he said.

Development and manufacture of a 16-bit mini is now a relatively risk-free effort, given an experienced technical staff, he added.

Basic/Four is currently supplying all U.S. shipments with its own mini and expects to supply overseas shipments early next year.

The firm chose to design a mini rather than incorporate a microcomputer because it didn't find any micros with sufficient horsepower to execute the DP load required by small businesses, Smith commented.

However, the firm is interested in using micros in other hardware applications and has put a micro of its own design into a disk controller, he said. Basic/Four makes all of its peripherals controllers.

About half of Basic/Four's shipments go abroad, he said, adding the firm's products have been doing extremely well in western Europe and have made good penetrations in parts of Latin America and Australia.

The company is expanding its direct sales and dealers overseas as well as its marketing force in the U.S. Currently there are dealers in 20 U.S. cities and direct salesmen in another 20, he said.

Smith intends to strengthen the firm's industry-oriented marketing effort. Software packages for business, insurance and hospitals are all being field-tested, he said.

Market Survival

Assessing the small business market, Smith remarked that those who will survive are already well-established.

"The key is strong distribution and the ability to make a product at competitive costs. It's going to be tough to come in if you don't already have a position," he added.

Basic/Four sees competition from vendors using gear from Digital Equipment Corp., "ever-present" IBM, Burroughs, Microdata and NCR.

Smith indicated Burroughs is strong where it has existing installations and NCR is relatively ineffective competition. However, he expects NCR will improve its position with more software for its 8200.

Microdata has done well where it has effective dealers, he said.

Contracts

Computer Sciences Corp. has received a Multiple Awards Schedule contract from the General Services Administration to supply time-sharing services to the Federal Government under the Teleprocessing Services Program.

Kokusai Denshin Denwa has been awarded a contract by the International Telecommunications Satellite Organization (Intelsat) for a forward error-correction coder-decoder program.

Systems Development Corp. has received a $1.2 million contract from Knickerbocker Federal Savings & Loan Association to operate a thrift services center in the New York City area.

General Telephone & Electronics Corp. has received a $722,000 contract from Comsat General Corp. for the construction of a communications satellite earth station.

Beehive International has signed a $1 million contract with Kienzle Apparate, GmbH, to provide 350-400 video display terminals.

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*SUPERWYLBUR is a mark of Optimum Systems Incorporated denoting a computer software system proprietary to Optimum Systems Incorporated.

Salaries are commensurate with experience and ability, and OSI provides an excellent employee benefits program. If the pursuit of excellence is the challenge you are seeking, we invite you to join our team. Please contact the Personnel Department, 2775 Northwestern Parkway, Santa Clara, California 95051. (408) 987-4444. Please, NO AGENCY REFERRALS.

An equal opportunity employer.

Optimum Systems Incorporated

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CIRCULATION DEPARTMENT

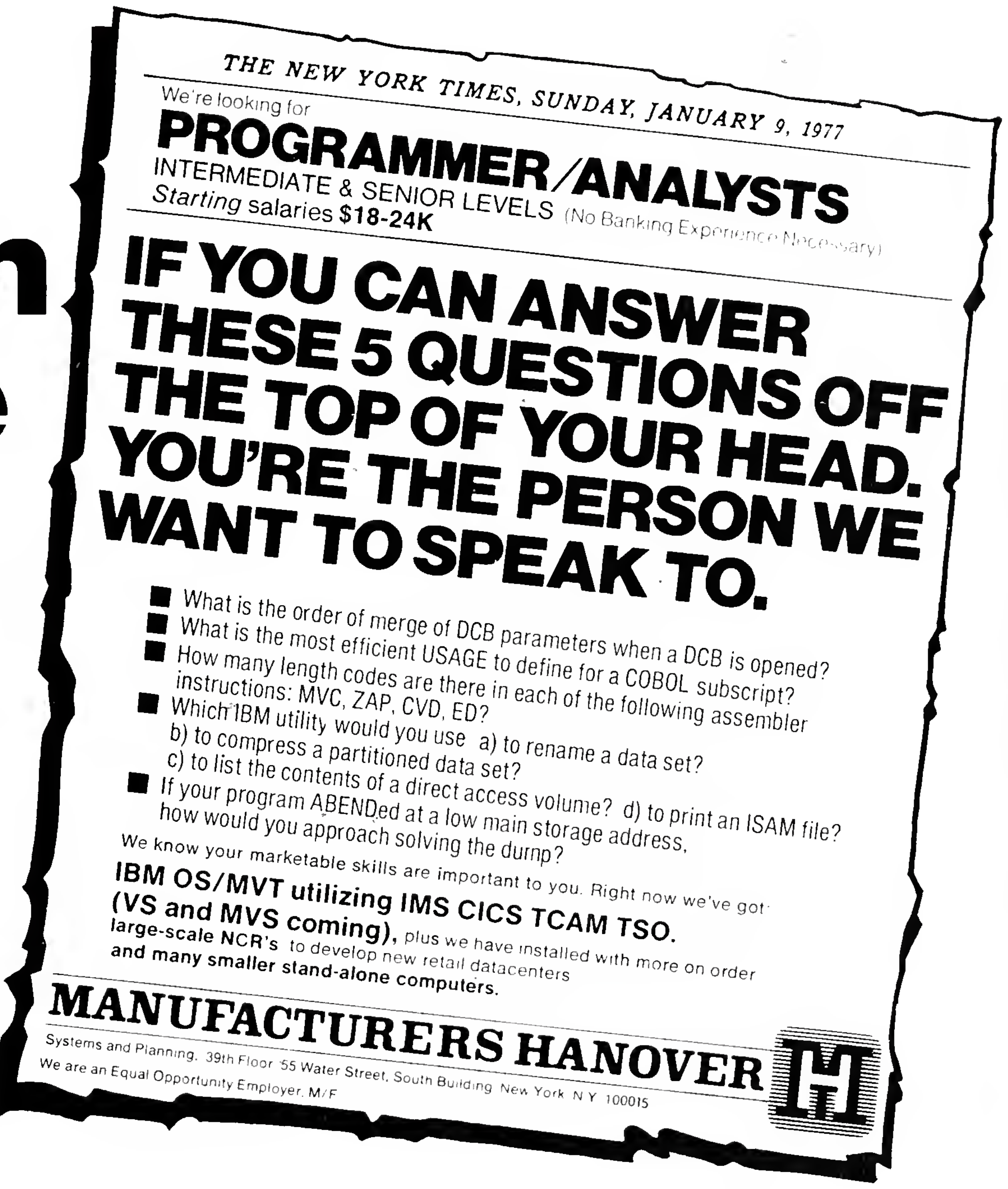
We're looking for

SYSTEMS/ANALYSTS

INTERMEDIATE & SENIOR LEVELS (No Banking Experience Necessary)
Starting salaries **$18-24K**

If this is what our technical people go through before we hire them,

IMAGINE THE SUPPORT YOU'RE GOING TO GET HERE.



THE NEW YORK TIMES, SUNDAY, JANUARY 9, 1977

We're looking for

PROGRAMMER/ANALYSTS

INTERMEDIATE & SENIOR LEVELS (No Banking Experience Necessary)
Starting salaries **$18-24K**

IF YOU CAN ANSWER THESE 5 QUESTIONS OFF THE TOP OF YOUR HEAD. YOU'RE THE PERSON WE WANT TO SPEAK TO.

- What is the order of merge of DCB parameters when a DCB is opened?
- What is the most efficient USAGE to define for a COBOL subscript?
- How many length codes are there in each of the following assembler instructions: MVC, ZAP, CVD, ED?
- Which IBM utility would you use a) to rename a data set? b) to compress a partitioned data set? c) to list the contents of a direct access volume? d) to print an ISAM file?
- If your program ABENDed at a low main storage address, how would you approach solving the dump?

We know your marketable skills are important to you. Right now we've got **IBM OS/MVT utilizing IMS CICS TCAM TSO. (VS and MVS coming),** plus we have installed with more on order **large-scale NCR's** to develop new retail datacenters **and many smaller stand-alone computers.**

MANUFACTURERS HANOVER

Systems and Planning, 39th Floor 55 Water Street, South Building New York N Y 100015
We are an Equal Opportunity Employer, M/F

We are your basic third generation OS/MVT shop. But the Programmer/Analysts we hire are not so basic. Before anyone gets hired, they must pass a two-hour technical interview (administered by two of our own employees, a Systems Analyst and a Programmer/Analyst held in high regard within our organization for their DP competence).

You'll have to go through an interview with our Technical Team too. After a brief screen for applicability with a technical representative, they're your first contact with our organization. The Team will probe deeply, ask you what you've done before. And they will then recommend an appropriate position that would best suit you.

ABOUT MHT: One of the country's largest commercial banks, we are also a sophisticated user of EDP. State-of-the art, MHT is an OK place for EDP professionals. There is job security in a stable environment; a computerized skills matrix, a career ladder and mobility system designed by computer professionals for computer professionals; in-depth semi-annual performance reviews and professional counseling; a special EDP Human Resource technical staff; an abundance of technical courses for EDP professionals . . . all paid for by the company, and on the company's time. Systems and Planning is a totally integrated department, and not an appendage to any user department. Your hours can be flexible. Working conditions are superior. There's a terminal close by for testing, you're surrounded by EDP professionals; education's one floor above you. It's a good professional environment, and you won't have to quit to get ahead.

For a convenient interview with a technical representative, call (212) 623-3276; **OR write** to Systems and Planning Department (someone who wasn't looking for a job doesn't have an up-to-date resume, we know that; it's OK to write); **OR drop by some time.** Our Technical Interview Teams will be on duty from **9 am-7 pm Monday through Friday** this week to see you if your experience is applicable.

MANUFACTURERS HANOVER

Systems and Planning, CW 0131, 39th Floor 55 Water Street, South Building, New York, N.Y. 10015.
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Systems Development

Systems &

Programming

DIRECTOR

Suburban Maryland multi-campus Community College has a challenging opportunity for individual to assume responsibility for coordination of the design and implementation of new and improved systems and for supervision of seven member professional systems and programming staff. Current installation has batch and on-line, real-time applications operating on IBM 370/135 under DOS/VS, Power/VS and using CICS/VS. Position will require appropriate academic credentials in a related discipline plus considerable systems design experience in on-line real-time applications at project management level. Starting salary range to mid-twenties plus excellent fringe benefits. Send resume, including salary requirements to Montgomery College, Personnel Office, 51 Mannakee Street, Rockville, Md. 20850 by February 28, 1977.

Equal Opportunity/Affirmative Action/Title IX Employer

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We are a highly professional recruiting firm specializing in Data Processing positions in the Pittsburgh and Tri-State area. At present our needs include COBOL (IMS) Programmers, IBM Systems/Programmers and Mfg. and Fin. Sustems/Analysts. Salaries range ot 20K (PROGRAMMERS) 26K 26K (SYSTEMS/PROGRAMMERS) and 25K (SYSTEMS/ANALYSTS). All fees and expenses are company paid.

If you have a sincere desire to relocate to the Pittsburgh area, send your resume (including salary history) in confidence to Barry Lopez c/o

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428 Forbes Ave. Suite 412
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(412) 391-7409

DALLAS

Improve your future when you join E-Systems. E-Systems is a leader in reconnaissance and intelligence gathering systems, electronics surveillance and other defense programs of a passive nature. We're a high technology systems company with annual sales of over $250 million. We market products and services in more than 40 different countries. Our stock is listed on the New York Stock Exchange. You'll own some of that stock if you come with the E-Team.

Make a good living where the living is good. There's no question — living is good in the Dallas area. Our public school systems have earned national recognition for excellence. We're one of the fastest growing areas in the nation, yet our housing dollar still buys considerably more home in Dallas than it would in most other metropolitan areas. We're surrounded by lakes, and blessed by beautiful weather year 'round. We back professional, university, and high school athletic teams, and we support our symphony, theaters, the civic opera and several museums. But, best of all, most of us are down home friendly people.

Product Software Programmers

Computer science professional with three or more years of real time programming experience using ALC on large scale and 16-bit mini-computers. You will be involved in program development, design, and analysis for large scale multi-tasking systems in advanced technology electronics. If you have had actual experience in product software programming, have a stable employment history, and a record of professional achievement, mail your resume today.

E-SYSTEMS
Garland Division
An equal opportunity M/F employer
US Citizenship Required

If you qualify, send your resume with salary history to:
Computer Science Manager
E-Systems, Inc.
P.O. Box 6118/Dallas, Texas 75222

SENIOR SYSTEMS SUPPORT ANALYST

"Position requires 2-5 years experience in the area of operating system support and/or real time programming. Successful candidate should have at least 2 years recent experience with DEC PDP-11 equipment using RSTS/E. (Unix experience is also desirable.) Unix experience is required for a second-position also open at this time. Must be able to communicate effectively with management and technical personnel both verbally and in writing. This position will have primary project responsibility for the initial installation of two or more PDP 11/70 RSTS/E systems for academic time sharing. The project position will report directly to the director of the computer center. Annual starting salary: $16,199. Application period ends 9/February/77. Send resumes to

Arizona State University
Personnel Department
ASB-301
Tempe, AZ 85281

An Equal Opportunity/Affirmative Action Employer who complies with Title IX of the Education Amendment of 1972."

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SoftwareCorp.

One of the Nation's fastest growing software development companies has immediate openings for:

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Applicants must be knowledgable of VS-1 internals and be willing to multiplex development and support with sales.

Liberal benefits - Salary to 30K

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(714) 636-8501

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NEEDED IN:

Virtual Systems

To participate in the planning, design and installation of a conversion from OS to SVS. Three-four years' experience in ALC and SYSGENS. Telecommunications and CICS experience desirable.

Timesharing

Three-four years' experience in operating systems, internals, timesharing control program and telecommunications.

Excellent salary, top benefits and growth potential with this energy leader. Send complete resume including salary history to the Personnel Dept.:

AMERICAN NATURAL
SERVICE COMPANY
One Woodward Avenue
Detroit, Michigan 48226

An Equal Opportunity
Employer M/F

REGIONAL MANAGERS MINICOMPUTER BUSINESS SYSTEMS

Randal Data Systems, Inc., one of the fastest growing minicomputer manufacturers, is seeking two marketing professionals to establish and manage regional offices - one in Atlanta covering the Southeast and the other in the greater New York, Boston or Philadelphia area for the Northeast.

The primary responsibility of each regional office is to establish new distributors for our minicomputer business systems and provide them with the support necessary to make them successful.

Successful applicants will be experienced in the marketing of computer-based business systems and have a working knowledge of software. Experience in setting up and supporting a distributor network is a plus.

Compensation includes base salary, commission, and expenses. A full benefit package is also provided.

First year earning potential is $35-40K.

Please send detailed resume, including salary history, to:

National Sales Manager
Randal Data Systems, Inc.
365 Maple Avenue
Torrance, California 90503

COMPUTER TERMINAL SALES

There's a world of difference at Digital.

It's quality that makes the difference at Digital Equipment Corporation. We've achieved over 60,000 computer installations worldwide by providing quality products backed by quality service.

We have positions available for sales professionals with a proven ability to establish new markets, meet quotas, train administrative order processing support personnel and have a proven identified history of successful computer and technical systems sales.

Individuals will sell hardcopy and CRT terminals in volume, primarily to the aerospace industry. Will also develop add-on systems, new accounts and maintain existing accounts.

Digital offers company-paid training, relocation, life and medical insurance, stock purchase plan, tuition reimbursement, retirement plan, competitive salary and qualified leased-car plan.

If you meet our qualifications, please send your resume, including salary history, in confidence to Digital Equipment Corporation, ATTN: Sheryll Gill, Dept. 101, 871 S. Nash, El Segundo, CA 90245. An Equal Opportunity Employer M/F.

digital

digital equipment corporation

PROGRAMMER

New England Nuclear Corporation, a prestigious world leader in the production of radiochemicals for research and diagnosis, has an immediate position available for a Programmer at the intermediate level in our rapidly developing Systems and Programming Department. The individual we are seeking will have 3-5 yeras experience working as a Programmer, knowledge of DOS/VS operating system, ANS COBOL, and RPG II.

Responsibilities will include writing new programs and the maintenance of existing programs.

New England Nuclear is a rapidly growing company which offers a comprehensive benefits package and competitive salaries. Our modern facility in Boston is eaily accessible and has a free parking area for our employees.

Interested applicants, please send resume and salary requirements to Emma Cuneo, New England Nuclear Corporation, 549 Albany St., Boston, Mass. 02118.

NEN New England Nuclear

An Equal Opportunity Employer

EDP NATIONWIDE SPECIALISTS SINCE 1957

Systems Pgmr—CICS, IMS	21K
Project Leader—TOTAL, PDP11	21K
Data Base Anal.—INSTALL IMS	22K
Pgmr/Analyst—COBOL, Mfg/Fin.	18K
Sftwr Pgmr/Anal.—PDP11 COBOL/FORTR	22K
Proj Engineer—CNC, Mach Tools	30K
EDP Auditor—BS or BA req'd	24K
Programmer—COBOL, CICS, TSO	17K

All positions are fee paid

J.W. Willard Associates, Inc.
agency

One Lincoln Center
Syracuse, N.Y. 13202
(315) 422-5111

SYSTEMS ANALYST

We seek an analyst who has recent online data base experience, to work with our systems staff in the development of a new master file system. If you have five years experience with a programming background, please send resume to Manager of Recruitment, American Hospital Association, 840 North Lake Shore Drive, Chicago, Illinois 60611. Please identify response to ad by giving job title.

An EO/AA Employer

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Conn. Corp. offers R & D resp to indiv with emphasis in statistical and simulation training. Advanced degree in O/R preferred along with D.P. exposure. Salary to $23,000. Contact Stan Durbas

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Fee paid — send resume to:

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Sandy Jones has talked to the major corporations. She knows where the great EDP openings and EDP dollars are — for analysts, reps, programmers.

Now, Sandy Jones wants to talk to you. With 10 years in systems, Sandy Jones can speak your language.

CALL: Ask for Sandy. (Or send resume in confidence)

(203) 838-4188

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149 East Avenue
Norwalk, Ct. 06851
Affiliates in 8 major U.S. cities and Hawaii
(Fees 100% paid by company)

PROGRAMMER/ANALYST

OMC, a multi-plant manufacturer of agricultural and industrial equipment located in Southern Minnesota (just 60 miles from Mpls./St. Paul) has an immediate opening for a PROGRAMMER/ANALYST. Candidates must have experience with D BOMP, BAL, ANS COBOL, RPG II. Also must have had experience implementing a Total Manufacturing System including MRP, capacity planning and shop floor control. Salary commensurate with experience. To investigate this opportunity contact R. Kromenaker, Professional Recruitment Dept.

Owatonna Manufacturing Company, Inc.
County Road 45 North
Owatonna, MN 55060
An Equal Opportunity Employer

DATA PROCESSING EDUCATION COORDINATOR

To $18,000

Major Philadelphia Bank seeks a person to develop and administer technical education programs which will provide and maintain the technical skills required for all employees involved with a sophisticated electronic data processing operation.

Successful candidate will have a good working knowledge of 3rd generation hardware and software technology plus a proven ability to develop and coordinate technical education programs.

Interested applicants please send resume to:

PERSONNEL DEPARTMENT

PSFS

12 South 12th Street
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Equal Opportunity Employer

MARKETING REPRESENTATIVES

COMPUTER PERIPHERALS (Regional)

We are seeking Marketing Representatives to sell unique Peripheral Products to End-User market. A track record with a minimum of 3 years successful sales experience in Computers or Peripherals is required.

Locales:

Southwestern, Southeastern Northwestern, & Southcentral United States. For experience, mature independence and effort we offer salary and commission plus substantial fringe benefits.

Please send resume in confidence to Mr. H.C. Mayors.

GRUMMAN DATA SYSTEMS CORPORATION
BETHPAGE, NEW YORK 11714

AN EQUAL OPPORTUNITY EMPLOYER M/F

DATA PROCESSING PROFESSIONALS

SENIOR PROGRAMMER

Requires 3-4 years experience of ANS COBOL experience in an IBM O/S environment. Experience with IMS DB/DC is preferred.

PROGRAMMERS & PROGRAMMER TRAINEES

Programmers should have 2-3 years experience in ANS COBOL. Banking experience would be helpful but not required.

Computer Science graduates will be considered for several trainee positions that exist.

Company offers attractive benefits and opportunity to developy your career in a challenging environment utilizing VS, IMS and an extensive communications network.

Please forward a complete resume including salary history in strict confidence to:

CW Box 4891
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer - M/F

There's Still Room on the Ground Floor at Amdahl

FIELD ENGINEERS

Immediate openings throughout the U.S. and Canada. Field candidates will undergo a training period in California on full salary with housing, transportation, and other expenses provided.

You will carry the Amdahl philosophy of customer service as well as your expertise into the field, utilizing your initiative and talents to aid the customer in restoring computer center operations regardless of the origin of the failure. Large system experience essential, preferably on compatible equipment. Please indicate 560-E on your response.

FIELD ENGINEERS: TEMPORARY DUTY IN EUROPE

Immediate openings for field engineers to work at Amdahl installations in Europe as an initial assignment. You will join the permanent field engineering staff, with your first assignment being approximately six months in Europe. Same qualifications as stated elsewhere in this ad for field engineers. Please indicate 905-E/Europe on your response.

FIELD SYSTEM PROGRAMMERS

We are generating constant field openings in concert with the rate at which 470V/6 shipments are growing. We need individuals with both the attitude and aptitude to carry our enthusiasm for unparalleled software support into the field. Immediate opportunities exist throughout U.S. and Canada.

You should have a need to feel useful to Amdahl users in a mixed-vendor environment and have a propensity for exuding the Amdahl enthusiasm. You must have a firm grasp on software systems, in-depth knowledge of large system internals (OS/MVT, VM, VS2, SVS, or MVS) and excellent diagnostic ability. Please indicate 362-E on your response.

Positions offered in this advertisement represent immediate openings only. If you have any talents that you believe could be exercised in the exciting Amdahl environment, please feel free to write us.

SYSTEM PROGRAMMERS MVT/SVS/MVS/VM

Software Technical Support

You will work closely with Amdahl field personnel and customers in our Field Support Center to resolve software problems encountered by Amdahl users. The job provides an opportunity to gain in-depth experience with operating systems components while actually shooting bugs. A detailed knowledge of the internals of at least one operating system, and a familiarity with operating systems utilities and SMP are musts for this job. Please indicate 357-E on your response to expedite.

Software Systems Maintenance

You will develop and maintain 470V/6 model-dependent support for each of the SCPs. Incoming maintenance material is reviewed and generated for redistribution to Amdahl customers. An opportunity to evaluate new SCP function and be involved in program development. A detailed knowledge of operating systems internals and concepts is required, along with a working knowledge of operating systems utilities and SMP. Please indicate 357-E on your response.

Software Quality Control

You will generate, apply, and review all software and materials distributed to users. The job provides an opportunity to operate systems in a hands-on environment. Successful candidates will possess a good working knowledge of operating systems components and operation. Additionally, close working familiarity with operating systems utilities, SMP, and assembler language is a must. Please indicate 357-E on your response.

We're looking for above-average talent. You can expect an above-average compensation and benefits package. Please direct your response to Manager, Professional Employment, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, California 94086. To expedite your application, please indicate on your resume or letter the response number contained in the text of the position offering. We are, of course, an equal opportunity employer.

amdahl

PROGRAMMERS OPERATING SYSTEMS

The Computer Center has 2 openings for Operating Systems Programmers with at least 1 years experience with Univac 1100 Assembly Language. Experience with compilers or telecommunications software is essential. A Bachelors degree in computer science, mathematics, the pure sciences or engineering is required. Salary open. Liberal benefits. Send resumes to: **Director, Computing Center**

STATE UNIVERSITY OF NEW YORK AT StonyBrook

STONY BROOK, NEW YORK 11794

An Equal Opportunity/Affirmative Action Employer

Several openings exist in our Material Handling Systems Division Department for software and hardware engineers. This department designs microcomputer-based control systems for automated material handling equipment and automated warehouses. These systems include microcomputer controlled stacker cranes, bridge cranes, conveyor systems, and warehouse traffic and inventory control systems.

Chief Software Engineer

Responsibilities consist of software engineering for automated material handling systems projects and technical supervision of a staff of programmers working on these projects.

Experience in automation of industrial machinery or processes using small computers (mini or micro) and a degree in EE, Computer Science or Math are required.

Microcomputer System Engineer

Responsibilities consist of configuration, design and checkout of microcomputer hardware, including I/O structures and packaging, for automated material handling systems projects.

A degree in EE or IE is required. Experience in automation of industrial machinery or processes and some programming ability are desirable.

Software Engineer

Responsibilities consist of software engineering and microcomputer programming for automated material handling systems projects.

A degree in EE, Computer Science or Math is required. Experience in automation of industrial machinery or processes using small computers (mini or micro) is desirable.

Please send resume and salary requirements to:

Personnel Department
CONTROL LOGIC, INC.
Nine Tech Circle
Natick, Mass. 01760

CONTROL LOGIC

Equal Opportunity Employer

WANTED:

Hardware/software experts to help build new computers to match the world's best software.

Telefile Computer Products, Inc., the only supplier of new peripherals and main memory for Xerox computer users, is embarking on a new challenge:

The development of two new Sigma computers. They will extend the line's capabilities well into the 1980's and take full advantage of Xerox' state-of-the-art CP-V and CP-R operating systems . . . software that the latest Datapro Research survey* shows as ranking first in the world.

Sigma 9 computer

- Will be micro-programmed
- Schottky MSI circuitry
- Prototype completion 12/77
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Sigma 11 computer

- 4 X faster than present Σ9
- One-half the price
- ECL logic
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All standard Telefile and Xerox I/O processors, main memory, and peripherals will be plug-compatible with both machines.

Telefile, located in the heart of California's sun-filled, dynamic Orange Coast, is staffing up now and needs these highly skilled professionals to help:

- CP-V and CP-R Development Programmers
- Programmers (All Languages)
- CP-V and CP-R Analysts
- Firmware Designers
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Only highly qualified applicants need apply for this exciting new venture with a computer company that has shown an average annual growth of over 50% five years in a row. Send resume and salary history to:

Mr. S. V. Edens, President
Telefile Computer Products, Inc.
17131 Daimler Street, Irvine, CA 92714

Telefile

Telefile does it again.

An Equal Opportunity Employer M/F

*Computerworld, December 6, 1976

SR. SYSTEMS ANALYSTS
SYSTEMS ANALYSTS

Challenging projects await the professionals who join the Chicago-based Illinois Central Gulf Railroad Company. Qualified applicants will have a minimum of 2 years of results oriented systems design and 1 year of programming experience. Familiarity with current Data Base Management techniques. IBM 370 hardware, and telecommunications is necessary. A strong working knowledge of a software environment consisting of COBOL and VS is also required. Submit a letter or resume including salary requirements in complete confidence to:

Personnel Officer
Illinois Central Gulf Railroad
233 N. Michigan
Chicago, Illinois 60601

An Equal Opportunity Employer M/F

Illinois Central Gulf

An **IC Industries** Company

FLORIDA

Retail Systems Division in Southern Florida has openings for qualified Analysts.

SYSTEM MGRS. SENIOR ANALYSTS

Requirements:

- College Degree
- General Accounting Applications
- On-line experience

Definite Pluses

- NCR Hardware and Operating System Knowledge
- Cobol and Assembly Language
- Experience in Multiprogramming
- Retail or Hotel experience

Salary commensurate with experience. Excellent fringe benefits. Send Resume and Salary requirements to:

J.D. Cates
NCR Corp.
1500 N. Federal Highway
Ft. Lauderdale, Fla. 33304

NCR

An Equal Opportunity Employer

MINI COMPUTER SPECIALIST

WNY co seeks unique combination of both tech. software knowl & broad systems requirements planning. This staff mgmt position offers good growth & visibility in medium sized MIS group. $19,500. (fee paid) Contact P. Siegal (in confidence)

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Buffalo, NY 14202
(716) 842-0801

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Opportunity for experienced professional to build a Mktg Team for established Datacenter & Mini Packages (360 Batch, Datapoint Remote Batch and Dispersed)

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Redlands, CA 92373
Bob Sporrong (714) 793-2855

SINCE 1962

Computer Programmer

needed immediately, skilled in PDP-11 to assist head programmer in voice recognition systems. BS or equivalent required. Must know PDP-11 assembly language and Fortran, able to work independently.

Excellent potential in fast growing company making digital voice recognition computers. Call Mrs. Moshier, in Cambridge (617) 876-8700.

An equal opportunity employer

SCIENTIFIC PROGRAMMER

Degree in engineering, computer science or equivalent experience. Machine language and preferably real-time and system experience on minicomputers. Numerical control, optical scanning or graphics experience a plus.

The above position provides an excellent starting salary, full fringe benefits program and outstanding career opportunity.

If you qualify forward resume to
Watson Peterson, Jr., Director of Personnel

Gerber Scientific Instrument Company

83 Gerber Rd. South Windsor, Conn. 06074

An equal opportunity employer, M/F

Career Opportunities for COMMUNICATION SYSTEMS ENGINEERS

Teletype Corporation, one of the largest manufacturers of telecommunications hardware, needs engineers with BSEE and computer science option. Some experience with EDP data terminals is desirable.

Involves the design of software for mini-computer and microprocessor based communications controllers. Should have background in data communications terminal design and PDP-11, Intel 8080 or equivalent software development experience.

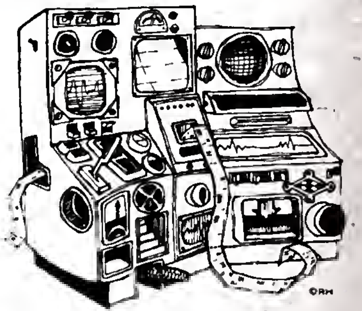
These positions offer exceptional potential for growth, excellent starting salaries plus outstanding benefit program.

Send resume in confidence to J.E. Taylor, Dept. 1617-3.

TELETYPE CORPORATION
5555 Touhy Ave., Skokie, Illinois 60076
An Equal Opportunity Employer M/F

TELETYPE

MEMO... FROM THE COMPUTER



ROBERT HALF IS THE OLDEST AND LARGEST SPECIALIST IN THE PLACEMENT OF COMPUTER AND FINANCIAL PERSONNEL.

AT ROBERT HALF OUR COUNSELORS ARE EXPERIENCED EDP SPECIALISTS.

PARTIAL LISTING OF AVAILABLE POSITIONS

Data Base Admins & Anals.	to $30K
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Systems/Analysts	to $25K
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Mini, Micro, N/C Programmers	to $21K+
Prog/Anals, Cobol, ALC, On-Line	to $20K+
Marketing Rep	to $15K + comm.
Programmers, Cobol, RPG, ALC	$13-16K
Operations Analyst	to $15K

Many other opportunities throughout the Southeast and United States. Call COLLECT between 9 a.m. to 5 p.m. (919) 855-5992 or reply in confidence to:

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ALL POSITIONS FEE PAID

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The Corporate Information Services Division of INA Corporation has an immediate opening for a CPE specialist with experience in application planning and implementation. In addition, a simulation background would be highly desirable. Responsibilities will include evaluation of application design and performance tuning of multiple large scale systems (3 IBM 370/168s).

This position is located in our modern data processing facilities in Southern New Jersey. Interested individuals should forward resume stating current salary in confidence to

INA
INA CORPORATION
**CORPORATE
INFORMATION
SERVICES DIVISION
Dept. MN, POB 36 Somerdale, N.J. 08083**

We are an equal opportunity employer with a progressive affirmative action program. Minority candidates are encouraged to apply.

TECH SUPPORT MANAGER

Major Southern bank seeks an individual with software experience in 370 OS environment. Client is running COBOL, BAL, and CICS under OS/VS. Financial background preferred. $20,000 FEE PAID.

**ROBERT HALF
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**12 S. Main St.
Memphis, Tenn. 38103
(901) 523-8950**

PROFESSIONALS ONLY

If you are a programmer programmer/analyst, systems analyst, or EDP professional and would like the most individualized job search offered in the data processing field today on a local or national level, forward your resume, with present salary and geographical preference, in strict confidence, to:

E.D.P. SEARCH, Inc.
P.O. Box 331
Hartford, Conn. 06105

NETWORKS

Our newly created distributed processing team is taking a "top down" approach in designing tomorrow's decentralized minicomputer approach to problem-solving. We'd like you to take on this challenge and join our team. Experience with ARPANET, DECNET, MAXNET, SNA, SDLC, HDLC, DDCMP, or ADCCP is preferred.

We have openings at both the senior designer and project leader levels within this group.

Send resume including salary history in strictest confidence, or call Bill Beattie, (201) 747-7300.

INTERDATA®
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PERKIN ELMER DATA SYSTEMS
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Equal Opportunity Employer M/F

SYSTEMS & PROGRAMMING MANAGER

The City of Tacoma, a progressive northwest city, is offering a challenging opportunity to manage a systems & programming staff of 24 persons with complete responsibilities for new project development, systems maintenance and systems programming.

Desirable qualifications for this position include a college degree, an operations as well as a systems background, experience with IBM computers and experience in municipal data processing applications.

Applicants should have a minimum of five years data processing experience with demonstrated managerial capabilities. Management style should be results oriented and excellent communications skills a must.

The City of Tacoma provides a comprehensive fringe benefit package and the salary range for this position is $1,800;month to $2,187/month.

Qualified candidates should submit their qualifications, employment and salary history, and references no later than February 4, 1977.

**To: City of Tacoma
Personnel Department
Room 531
County-City Building
Tacoma, Washington 98402**

Equal Opportunity Employer

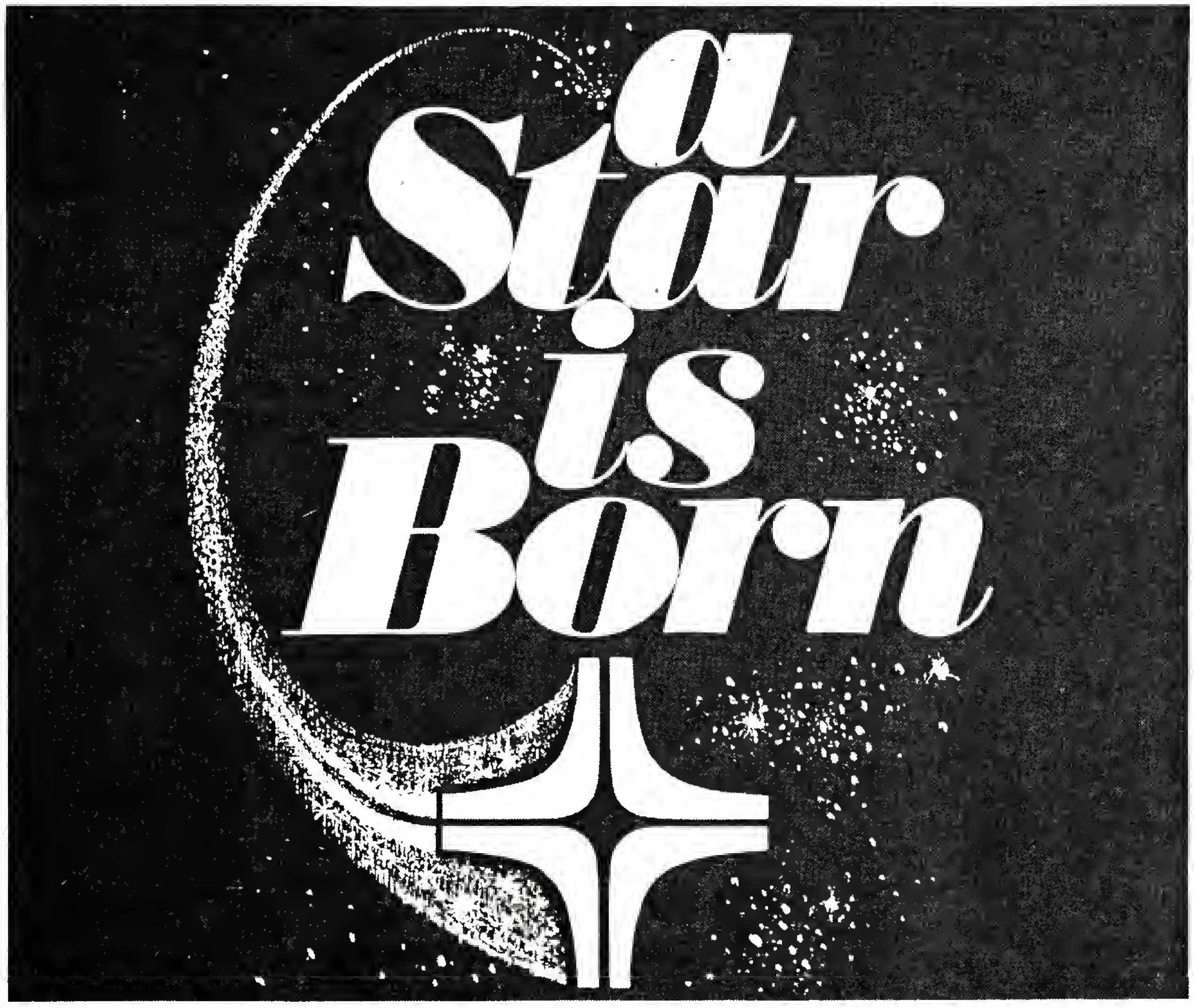
MANAGEMENT AND SYSTEMS ANALYST CITY OF MOBILE

Opportunity for individual to implement and coordinate a large computer based financial information system for municipal government. Should be motivated to enhance governmental effectiveness through E.D.P. Should have good background in higher level computer languages including COBOL. Experience in DOS/VS and CICS preferred but not required. Salary range $15,684-$17,880. Send resume in confidence to M.A. Walsh, Controller, P.O. Box 1827, Mobile, Ala. 36601.

SYSTEMS ANALYSTS APPLICATION PROGRAMMERS SYSTEMS (SOFTWARE) PROGRAMMERS

All levels of experience, including Project Managers.
Starting salaries $13,500 to $26,000.
Companies pay all fees & expenses.
Resumes published under code numbers — no names. Our client firms are located nationwide and are engaged in every type business.
FREE — EDP OPPORTUNITIES BULLETIN, a representative list of our DP career opportunities, mailed free of charge upon request (HOME ADDRESS ONLY).
For further information on these and other positions, send your resume in strict confidence to:

**Mark Fuller
Cadillac Associates, Inc.**
32 W. Randolph St.
Chicago, IL 60601
(312) 346-9400



Computer Sales Representatives & Applications Support Representatives are invited to unveil a new career with the Sperry Univac BC/7 Business Computer

Sperry Univac has recently introduced a low cost, on line, cardless, easy to use, flexible business computer. A computer for the application systems solution marketplace that provides the power of a large scale operating system. As a result, we are focusing the spotlight on ambitious, proven and hard working computer sales and applications support representatives like you. Because without you, the BC/7 will never achieve the stardom that is its destiny. And you may never again be faced with an opportunity to assume an exciting new role that combines the dynamics and growth potential of a new venture with the solidarity of an established, industry giant. If your background is commensurate with either of the following job descriptions and you're looking to achieve maximum earnings and opportunity for accelerated career advancement, we'd like to speak with you.

SALES: Requirements call for a couple of years successful computer sales experience and the self confidence to go knocking on doors without an accompanying entourage. The Sperry Univac marketing concept calls for Sales Reps to play the leading roles, and provides the finest software supporting cast in the industry to back them up.

APPLICATIONS SUPPORT: Requirements call for 2-3 years diversified RPG II applications, programming and installation experience. A working knowledge of accounting and/or manufacturing procedures would be a definite plus.

These positions provide high earnings and accelerated career paths.

OPENINGS IN 18 MAJOR CITIES

OPEN HOUSE in most locations Wednesday, Feb. 2.

You may make contact with our representative in your area by calling 1-800-821-7700, Ext. 307 toll free. (Missouri residents should call 1-800-892-7655). Or you may prefer to send your resume or letter of interest to Mr. Juris C. Peice, Manager-Employee Relations, Sperry Univac, P.O. Box 500, Bluebell, Pa. 19422.

SPERRY UNIVAC

Sperry Univac is a division of Sperry Rand Corporation
Making machines do more so man can do more
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DATA PROCESSING MANAGER

NORTHERN CALIFORNIA

McClatchy newspapers, a multiplant group of newspapers with radio and television stations, has challenging position at corporate level in Sacramento for data processing manager with strong experience and supervisory background. Should have minimum two years supervisory experience in medium sized DP shop with 3rd generation equipment. Good salary plus liberal vacation, medical and retirement benefits. All replies held in strict confidence. Send detailed resume including availability for personal interview to:

**Personnel Department
McClatchy Newspapers
21st & Q
Sacramento, California 95813**

An Equal Opportunity Employer

FACULTY POSITION DATA MANAGEMENT

The Quantitative Methods Department, School of Management, Syracuse University invites applications for Assistant/Associate Professor of Data Management. Responsibilities include developing and teaching courses in information handling, systems analysis, and data management. Also included are maintaining liaison with community data management executives and participating in Departmental activities involving mid-career training programs and research. Applicants should have completed or nearly completed the Ph.D. or equivalent. Appointment is for a regular faculty position beginning September 1977. Salary is open. Contact:

Professor William Hannum,
School of Management, Syracuse University, 116 College Place,
Syracuse, NY 13210

Application deadline is March 1, 1977. Syracuse University is an equal opportunity employer.

PROG/ANALYST TO $16.5K

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370/135 DOS/VS going to 370/148

If you want to work in the "state of the art" environment, with good growth potential, excellent benefits, and have 2-5 years experience with COBOL, consider this position. Our candidate will learn CICS, DL/1, VSAM, DMS, and work with a talented staff. Unfortunately, we cannot reimburse you for relocation costs. For appointment, please call (212) 673-3000, ext 2513 or write to:

**BETH ISRAEL
MEDICAL CENTER**

**Personnel Department
421 14th St.
New York, N.Y. 10009**
An Equal Opportunity Employer

SENIOR SYSTEMS ANALYST/ QUALITY ASSURANCE

Excellent opportunity for Systems Analyst experienced in quality assurance, standards and procedures, or program test methods. This is a newly established position offering an outstanding career opportunity. The successful candidate should have a degree (min. BS/Computer Science) and be a self-motivated professional. Outstanding compensation and fringe benefit plan. If you are interested in growing with a professional team, please submit your resume to:

**Blue Cross and Blue Shield
of North Carolina
P.O. Box 2291
Durham, N.C. 27702
Attention: J. Steiner**
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SYSTEMS ANALYSTS

Excellent opportunity to have an impact on the future requirements for EDP equipment of this leading Midwest airline. Must have equipment evaluation experience and application and software evaluation exposure. $24,000. Fee paid.

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PERSONNEL AGENCIES
522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

MANAGEMENT INFORMATION ANALYST

$18,000-$20,000 Annually

Opportunity for an experienced analyst to develop on-line, data based municipal systems. Analyst will be working on a mini-computer using a DBMS with Query and COBOL. Requirements include an accounting, business or math major with a minimum of 3 years EDP systems experience. Mountain View is near Stanford University in the San Francisco Bay Aare. Final filing date is February 14, 1977. Send resume to City of Mountain View, Personnel Office, P.O. Box 10, Mountain View, CA 94042 (415) 967-7211, EXT. 273.

EDP, ELECTRONICS

As specialists in EDP and digital electronics we can help you in a job change through one of our 200 national offices. Positions in EDP, mini and micro process control, micro proc design, sales and data communications. Send resume, salary and location preferences to:

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801 Broad St.
Augusta, GA 30902
(404) 722-5741
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DATA PROCESSING SALESPERSON

Data processing service bureau in Newport Beach, Southern California.

Must be experienced. Excellent opportunity. Submit resume with salary history to President.

HDC Corporation
1801 Dove
Newport Beach, CA 92660

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BMS Computer is looking for independent software agents to represent the CIMS job accounting & system performance reporting product. The CIMS product received an award of merit from Datapro. Openings available in most U.S. cities & Europe. For further information, please contact:

Larry A. Lynch
BMS COMPUTER INC.
P.O. Box 3086
Walnut Creek, CA 94598
(415) 938-2620

Business & Scientific Data Processing Professionals

Babcock & Wilcox is a multi-technology leader involved in energy systems, engineered materials and industrial automation. We currently have longterm career opportunities at our Alliance R&D Center for professionals with the expertise described below:

SYSTEMS ANALYSIS

Will analyze and design MIS systems. Requires BS-Math, Computer Sc. or IE plus at least 5 years experience heavily oriented towards information requirements analysis and systems design. Expertise in data base management systems highly desirable.

BUSINESS PROGRAMMING

Design, develop, test and document computer programs in support of new R&D Division MIS. Must have BS in Math or Computer Sc. and possess minimum 3 years experience in development of new systems utilizing data base management systems, such as TOTAL, IMS.

SCIENTIFIC PROGRAMMING

Will solve engineering-related problems through use of Applied Math, numerical analysis, algorithm development and computer programming FORTRAN. Must have MS-Math and at least 3 years experience in above.

ALL POSITIONS REQUIRE U.S. CITIZENSHIP

Attractive salary commensurate with education and experience, plus excellent company benefits. Our Alliance, Ohio location is a fine place for good living with convenient proximity to the Cleveland and Akron metropolitan areas. Please send resume with salary history and requirements in confidence. Indicate clearly position of interest, Write: Mr. R.W. Elam, Babcock & Wilcox, R&D Center, 1562 Beeson St., Alliance, O. 44601. We're an equal opportunity employer male/female.

Babcock & Wilcox
Research and Development Division

DATA BASE MANAGEMENT PROGRAMMERS MOVE ON WITH NO.1

MOVE ON TO MORE PROFESSIONAL INVOLVEMENT . . .

These immediate opportunities within our Technical Services Group at Harley-Davidson Headquarters in Milwaukee offer involvement in major projects in both manufacturing & administrative applications. Projects requiring people with demonstrated skills and high personal advancement potential.

MOVE ON TO MORE CAREER ACHIEVEMENT . . .

As a leading and aggressive manufacturer of recreational vehicles, Harley Davidson has maintained a profile of sustained growth for several years. This profile provides opportunity for significant contributions by innovative data processing professionals in a career environment which affords a high level of visibility and recognition.

MOVE ON TO PERSONAL SATISFACTION . . .

Involvement, on-going challenges, visibility and recognition form the basis for strong career growth. We in turn are seeking certain strengths from you.

DATA BASE CANDIDATES will have at least 3 years of current DB applications and management. Complete familiarity with BAL, VSAM; understanding of DL/1 in a DOS/VS environment, with CICS exposure; MIS experience including qualified DB background. Responsibilities encompass the analysis and implementation of new DB concepts, applications, and methods.

PROGRAMMER CANDIDATES will have several years of PL/1 experience in manufacturing, system design exposure, DL/1 and CICS familiarity in an IBM 370 environment.

Exceptional salaries and generous benefits plan are offered.

Send resume in confidence, complete with salary history, to:

Personnel Dept.
HARLEY DAVIDSON MOTOR CO.
3700 West Juneau
Milwaukee, WI 53201
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SUPERVISING SYSTEMS ANALYST

to assist in developing a state judicial information system, 1st year federal funds have been provided for the project.

Extensive management and line responsibilities for work plan preparation, needs assessment and systems design. Bachelor's degree in Business Administration, Management Science, Information Systems or 4 years systems analysis experience. DBMS design experience required. Starting salary $15-17,000.

Send a complete resume with salary history and references by February 11, 1977 to:

Director, SJIS
Administrative Office of State Courts
Providence County Courthouse
250 Benefit Street
Providence, R.I. 02903
Equal Opportunity Employer M/F

SYSTEMS ANALYST FULL-TIME

Community college in southwest Chicago suburb has opening for Systems Analyst involving work with IBM 370/135. Running an on-line system using DOS/VS and ANS COBOL. Duties include designing systems and supervising programming staff in systems implementation. Requires 4 years experience as Senior Programmer or Anlayst; training in systems design; project management and supervisory techniques. Salary commensurate with qualifications. Applications received by Jan. 31, 1977 guaranteed consideration. Contact Personnel Office.

MORAINE VALLEY
COMMUNITY COLLEGE
10900 So. 88th Ave.
Palos Hills, IL 60465
(312) 974-4300

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Sr. Systems Analysts **to $22K**
Assignment to Internal Management Consulting Group reporting to EVP of bank holding company.

Programmers **$13-16K**
BAL and/or COBOL. Solid growth potential.

Programmer Analysts **$ open**
Financial, Insurance, Banking, or Manufacturing background. OS exper. and degree required for some positions.

Systems Programmers **$18-24K**
Real Time Monitor development, OS, Compiler and/or file access methods development on large scale systems. Communications and CICS exper. a plus.

Mgr. of Tech. Training **to $30K**
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MBA
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ASSOCIATES, inc.
2741 N. 29 Ave., Suite 212,
Hollywood, Fl. 33020
(305) 947-6557
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PROGRAMMERS

Newport, Rhode Island

Due to recent growth, openings at all levels exist for:

PROGRAMMER/ANALYSTS

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DOCUMENTATION

Duties will include preparation of Hardware and Software documentation. Previous systems analysis experience or technical writing in a programming environment is desired.

All positions are located in Newport, Rhode Island, a unique small community offering vast recreational and cultural opportunities. We offer interesting assignments, attractive starting salaries, fringe benefits and paid relocation.

Please send resume to Jim Zompa

SCI
SYSTEMS CONSULTANTS INC

P.O. BOX 330
MIDDLETOWN, R. I 02840

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SENIOR PROGRAMMER ANALYST PROGRAMMERS

Union Planters National Bank of Memphis, the Southeast's leading bank in the field of EFT and POS, is seeking DP talent to add to its staff of computer professionals. Union Planters has immediate openings for programmers and Senior Programmer Analysts in its large IBM 360/OS MVT installation. Experience with COBOL and OS environment is required and additional experience with IMS and assembler is desirable. Programmers should have 1-2 years experience and Senior Programmer Analysts should have at least 3 years experience as indicated above. Salary commensurate with experience.

Submit resume and salary history in confidence to:

UNION PLANTERS
NATIONAL BANK
Personnel Services
P.O. Box 387
Memphis, TN 38147
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NBC

Senior Systems Programmers

Two senior positions are now open in the New York NBC systems programming group. Each requires a minimum of 3 years experience in a large scale UNIVAC 1100 series communications environment plus knowledge of UNIVAC assembler and FORTRAN.

One position is in the group which designs, implements, and supports in-house systems software. Knowledge of TIP 1100 is desirable, as is experience in systems evaluation.

The second position is in the operating support group, and includes responsibility for the support of a nationwide communications network and the scheduled installation of front end computer and remote minis. A knowledge of UNIVAC communications software is required.

To apply, please send a detailed letter or resume, including salary history and requirements in confidence to: Mr. Robert Hall, Personnel Department, National Broadcasting Company, 30 Rockefeller Plaza, New York, N.Y. 10020. We are an affirmative action employer, m/f.

PROJECT LEADER

Manufacturing-Distribution Co. has an EXCELLENT position for an individual who is self-motivated and has 4 to 6 years in commercial data processing. This position will aid in long range planning, do systems design, programming, and provide guidance to Jr. personnel, Experience in RPG 11 a plus. Paid relocation expenses. Send your confidential resume to:

Frank Smith

Safelite Industries

P.O. Box 1879
Wichita, Ks. 63701

or call 1(800)835-2364

FIELD ENGINEERS

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Houston	Rochester
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These positions provide excellent compensation, challenge, and an environment conducive to personal and professional growth. If you're interested in working for a progressive company with an excellent growth record and a bright future, call toll-free 800-523-5632, or send your resume to: Bill Patch, Personnel Director, SORBUS INC., 150 Allendale Road, King of Prussia, PA 19406. An Affirmative Action Employer.

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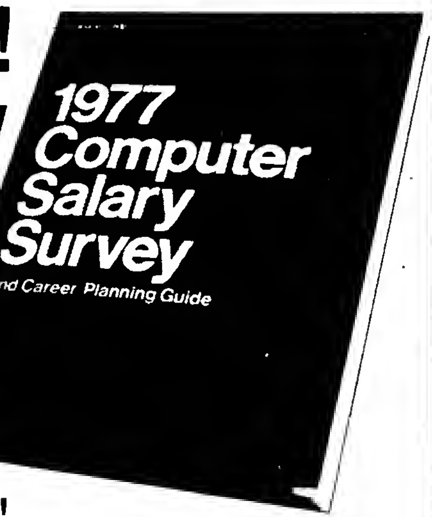

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New York/ New Jersey	201/687-8700	Denver	303/773-3700
Philadelphia	215/665-1717	Fort Worth	817/338-9300
Washington, D.C.	703/790-5610	Houston	713/626-8705
		New Orleans	504/561-6000
Midwest		**West Coast**	
Chicago	312/782-0857	Irvine, Ca.	714/833-1730
Oak Brook, Ill.	312/986-0422	Los Angeles	213/386-5500
Cleveland	216/771-2070	Palo Alto	415/328-7155
Detroit	313/352-6520	San Francisco	415/434-2410
Kansas City, Mo.	816/474-3393	Torrance, Ca.	213/540-7500
Minneapolis	612/544-3600		
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(When writing, please be sure to indicate home address and current position title.)

If unable to call, write:
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Newton, Mass. 02160

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If you've reached a plateau in your career, our Commercial Division can offer you excellent opportunities. You should have at least 10 years professional data processing experience, plus demonstrated abilities as a manager or consultant. Experience in managing large data centers especially in the state or local government environment would be a definite asset. A Master's degree is desirable but not mandatory.

For immediate consideration, send your resume, including salary history, in confidence to:

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- Supervise system integration planning and execution for a large virtual storage system. Define and implement integration processing for a Multiprocessing Multiprogramming system.
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- Design and develop state-of-the-art firmware packages for a new computer line. Candidates should be knowledgeable in computer architecture, firmware development, high level language implementations using firmware, and operating system principles. Programming experience should emphasize assembly language or microprogramming.

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- Position requires individual capable of performing computerized test system software development, digital logic, simulator development, and system diagnostic programming. BSEE or Computer Scinece degree and previous related experience required.

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents. Full relocation expense allowance.

Please submit resume including salary history and experience or apply in person to: Professional Placement Office.

NCR

Data Processing Division
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Position requires a minimum of:

- 5-10 years of direct commercial EDP industry hardware experience and broad knowledge of the market.
- Successfully having planned, designed, marketed or evaluated computer hardware — preferably more than one.

Qualified candidates will have hardware design, market/product planning, or applications/customer support experience within the industry OR good systems support or hardware evaluation experience with a major EDP user. Good oral and written presentation skills required. A technical degree is required, with MBA or other advanced degree desirable.

Please send resume and salary requirements in confidence to:

JOHN J. BRENNAN, VICE PRESIDENT
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(816) 421-6031

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Consultants to the Computer Industry

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OMICRON is a SAN FRANCISCO based professional search firm, serving client companies on a contingency or retained basis, to aid in the selection, screening and placement of computer professionals.

We currently have urgent needs for Systems Software Professionals with the following backgrounds.

SYSTEMS PROGRAMMERS

Several requirements currently exist for individuals with extensive experience on large-scale IBM 370 Systems (ie; OS/MVT, VS1, VS2, SVS, MVS)

TELEPROCESSING SYSTEMS

Various needs also exist for senior level persons with T.P. hardware and software expertise such as CICS, INTERCOMM, VTAM/NCP, VSAM, 3705, etc.

For these and other systems Software opportunities, please call or write, in confidence, to OMICRON, One Ecker St., (Ecker & Stevenson Sts.), San Francisco, CA 94105.

Exclusively employer retained agency

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(Ecker & Stevenson Streets)
SAN FRANCISCO, CA 94105

SOFTWARE DEVELOPMENT SPECIALISTS

Infodata Systems, prominent in data base management and information retrieval systems, is looking for several Senior Software Development Specialists to participate in state-of-the-art software projects intended to create signfiicant innovation in the marketplace. Large scale software systems design and implementation in an IBM, OS, VS, or MVS environment is required. Comprehensive assembler language or PL/1 experience is also required. Familiarity with any of the following is desirable: OS/VS internals, data base structures, VSAM, or artificial language design. For the right persons, compensation will be exceptional. These positions are at our suburban Washington, D.C. office.

Send resume with salary history, or call:

Mr. Harry Kaplowitz
Infodata Systems, Inc.
5205 Leesburg Pike
Falls Church, VA 22041
(703) 578-3430
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Affirmative Action Employer

Medical Center
Director of Data Processing

Our client, a prestigious Southeastern University Medical Center, seeks a capable, experienced, highly motivated individual to direct its data processing activities. A minimum of five years experience in data processing with significant experience in a supervisory capacity is required. Experience in the health care field and master's degree are a plus. The successful candidate will be an energetic self-starter who is seeking a challenging and rewarding career. All responses will be held in strictest confidence. Send resume and salary history to

CW Box 4887
797 Washington St.
Newton, Mass. 02160

SOFTWARE

Our client a multi-hardware user is currently seeking senior systems programmers for their computer department. IBM 370 VS SERIES

HONEYWELL 6000 SERIES

Exposure to either database, teleprocessing or general operating system troubleshooting is required.

SALARY $17-25K +

These positions are all in the Northeast and offer excellent career growth and management training. Contact Mark Burn, MALLORY DATA SYSTEMS AGENCY, 120 B'way, Suite 3114, NYC 10005 (212) 964-2060

Programmers & Systems Analysts

Kaiser Permanente is the largest prepaid health plan in the United States. Our Information Services Department in Southern California provides programming and systems services to our 7 medical centers. We are currently offering exceptional opportunities to:

PROGRAMMERS

The successful applicants should have solid OS and COBOL experience on large IBM equipment. Must be familiar with the new improved programming productivity techniques, or have the desire to learn and work in this type of environment. CICS and data base background, along with experience as project leader is desirable.

SYSTEMS ANALYSTS

Excellent growth potential to individuals with data base, CICS and medical, financial, or large membership systems experience.

We provide excellent salaries, and outstanding benefits including employer paid health and dental plans for yourself and eligible dependents, life insurance, sick leave and a liberal vacation plan. All this under the warm sunny skies of Southern California. Sound ideal? It is! Our appealing location offers an abundance of recreational activities and cultural attractions.

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Salary history and minimum salary requirements to:

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Los Angeles, CA 90027
OR CALL US COLLECT
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Equal Opportunity Employer M/F

DIRECTOR OF COMPUTER SERVICES CENTER

The Director reports to the Vice President for finance and management, and coordinates the work of systems and programming, computer operations and data entry personnel. The college has a Burroughs B-4700 computer. The director works with management in planning the near and long term direction of computing for the campus. The overall administrative objective is to develop a base of management information which can be used in both the daily operation of the college and as a management tool for long range planning. The computer services center also works with interested faculty in providing instructional and research support services.

Significant management experience required and ability to work effectively with others. Demonstrated ability in overall analysis, design, programming and implementation of major systems projects. Familiarity with a vareity of data processing operational equipment and Bachelor's degree required. Prior COBOL programming and experience in academic institutions desirable. Salary negotiable. Position to be filled as soon as possible. Send resume to:

Mrs. Lorraine L. Bagley, Affirmative Action Officer, HAB 902
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We are the leading independent supplier of data entry and communications systems in the industry, and have immediate career opportunities for software specialists to actively participate in the development of major new products.

We have opened a new software development facility in West Caldwell, New Jersey, and invite you to contact us if you desire to work in a challenging and creative advanced systems environment, and have micro/mini computer Assembler Language expertise in:

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- Language Processors
- Data Communications

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MR. DAN McCONNELL
Director of Personnel

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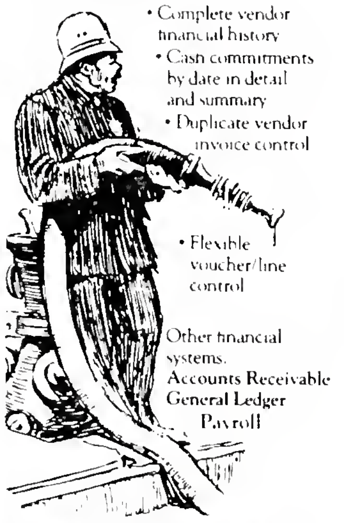

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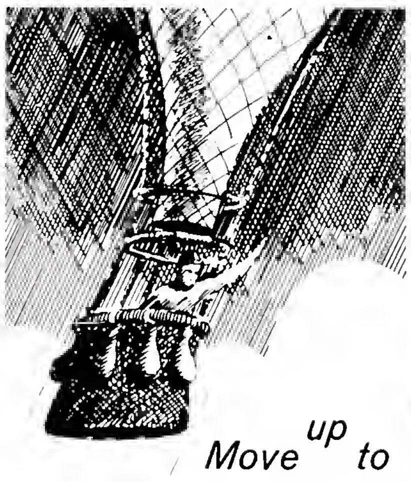

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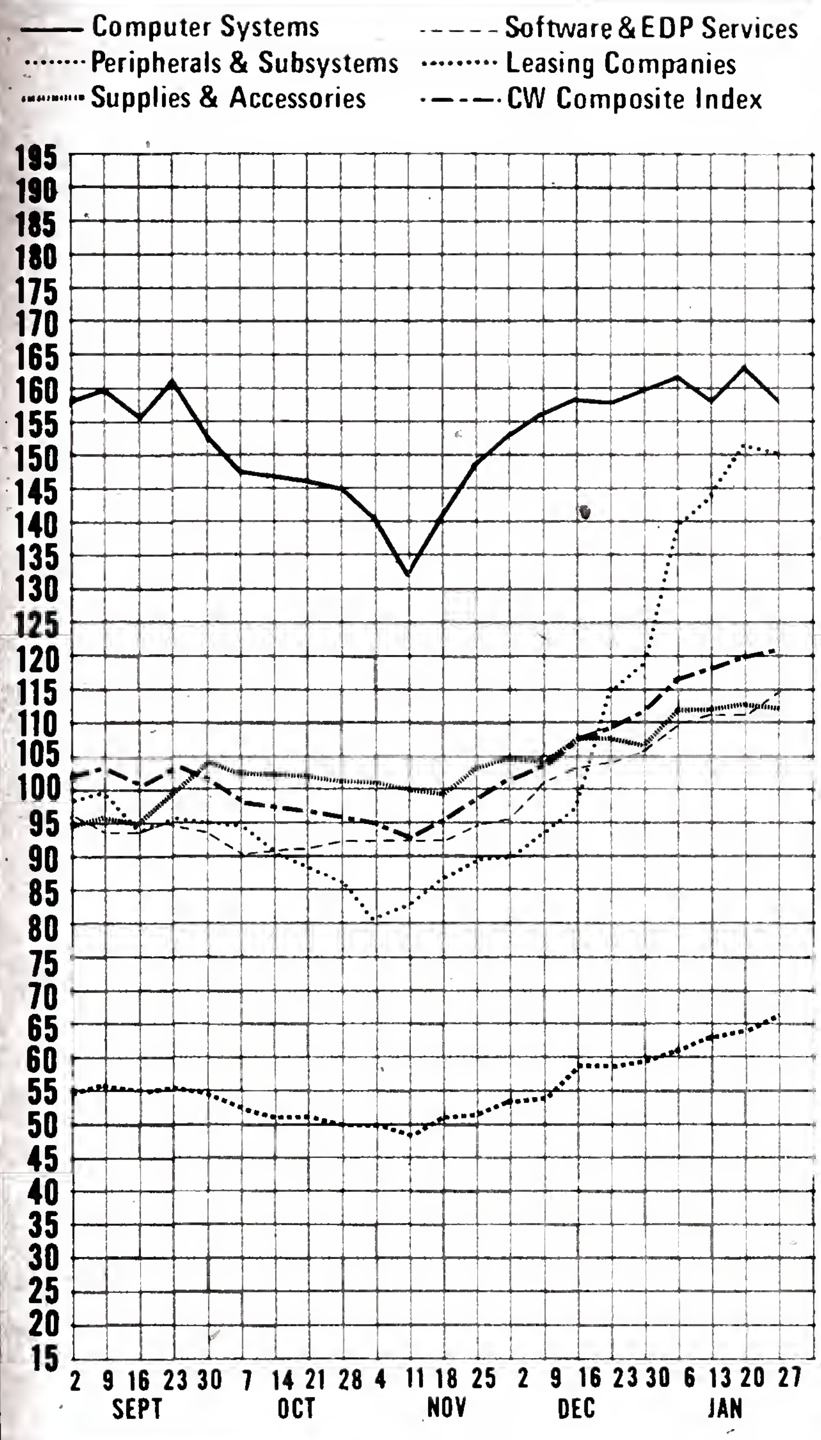

Earnings Reports

DATUM

Three Months Ended Sept. 30

	1976	1975
Shr Ernd	.....	$.02
Revenue	$3,765,000	3,480,000
Earnings	a(1,184,000)	36,000
9 Mo Rev	10,507,000	9,768,000
Loss	a1,616,000	1,000

a-Includes $1,304,000 charge in quarter and $2,247,000 charge in nine months for inventory writedowns, elimination of intangible assets related to prior acquisitions and cost overrun adjustments of several contracts.

WYLY

Three Months Ended Sept. 30

	1976	a1975
Revenue	$15,314,000	$15,795,000
Disc Op	.....	(34,156,000)
Loss	1,880,000	35,885,000
9 Mo Rev	46,185,000	46,799,000
Disc Op	(65,331,000)	(42,397,000)
Loss	69,661,000	47,927,000

a-Restated.

DATA TERMINAL SYSTEMS

Three Months Ended Oct. 31

	1976	1975
Shr Ernd	$.40	a$.12
Revenue	5,304,312	2,345,161
Earnings	612,917	155,876
9 Mo Shr	1.18	a.38
Revenue	14,723,792	7,594,865
Earnings	1,650,538	502,828

a-Adjusted for May 1976 three-for-one stock split.

GENERAL DATACOMM INDUSTRIES

Year Ended Sept. 30

	1976	1975
Shr Ernd	$.60	$.26
Revenue	15,955,939	13,124,701
Tax Cred	373,900	176,730
Earnings	852,908	369,348

GENERAL INSTRUMENT

Thirteen Weeks Ended Nov. 28

	1976	a1975
Shr Ernd	$.63	b$.23
Revenue	125,071,871	100,376,122
Disc Op	.....	(370,000)
Earnings	5,408,169	2,088,911
39 Wk Shr	1.58	b.73
Revenue	349,310,858	280,553,149
Disc Op	.....	(1,459,000)
Earnings	13,555,013	6,502,076

a-Restated to reflect foreign currency translation. b-Adjusted for May 1976 2% stock dividend.

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 26, 1977

All statistics compiled, computed and formatted by
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COMPUTER SYSTEMS

EXCH		PRICE 1976-77 RANGE (1)	CLOSE JAN 26 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	23- 40	32 3/4	-2 1/2	-7.0
N	BURROUGHS CORP	74-108	74 3/8	-4 1/2	-5.7
O	COMPUTER AUTOMATION	10- 23	21 5/8	-1 5/8	-6.9
N	CONTROL DATA CORP	18- 27	25	-1 1/4	-4.7
N	DATA GENERAL CORP	40- 60	41 1/2	-2 3/8	-5.4
O	DATAPOINT CORP	24- 46	24 1/4	-2	-7.6
O	DIGITAL COMP CONTROL	2- 7	6 3/4	- 1/8	-1.8
N	DIGITAL EQUIPMENT	45- 60	45	-4 5/8	-9.3
N	ELECTRONIC ASSOC.	2- 5	3	+ 1/8	+4.3
A	ELECTRONIC ENGINEER.	7- 16	9 3/8	0	0.0
O	FOUR-PHASE SYSTEMS	13- 21	16 1/4	0	0.0
N	FOXBORO	28- 51	44 7/8	- 5/8	-1.3
O	GENERAL AUTOMATION	4- 11	8 1/4	+ 1/8	+1.5
O	GRI COMPUTER CORP	1- 1	3/8	- 1/8	-25.0
N	HEWLETT-PACKARD CO	78-117	79 1/4	- 1/8	-0.1
N	HONEYWELL INC	34- 56	44	-3 1/4	-6.8
N	IBM	227-288	268 1/4	-9 1/4	-3.3
O	MANAGEMENT ASSIST	1- 9	7 5/8	0	0.0
O	MEMOREX	17- 33	25 3/8	-1 5/8	-6.0
O	MICRODATA CORP	10- 28	14 5/8	- 7/8	-5.6
O	MODULAR COMPUTER SYS	3- 14	5 3/4	- 3/8	-6.1
N	NCR	24- 38	34	-1 1/2	-4.2
O	PRIME COMPUTER INC	4- 18	17	+1 3/4	+11.4
N	PERKIN-ELMER	19- 27	20 1/8	+ 5/8	+3.2
N	RAYTHEON CO	45- 67	57 7/8	-1 7/8	-3.1
N	SPERRY RAND	39- 52	38 3/4	-1 1/2	-3.7
O	SYCOR INC	9- 31	12 5/8	-1	-7.3
A	SYSTEMS ENG. LABS	5- 10	7	+ 1/4	+3.7
N	VARIAN ASSOCIATES	12- 17	16 7/8	+ 5/8	+3.8
A	WANG LABS.	11- 20	15 1/4	+1 1/2	+10.9

LEASING COMPANIES

EXCH		PRICE 1976-77 RANGE (1)	CLOSE JAN 26 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE COMPUTER CORP	1- [illegible]			
O	COMDISCO INC				
A	COMMERCE GROUP CO				
A	COMPUTER INVSTRS G	[illegible]	1 7/8	- 1/4	-11.7
M	DATRONIC RENTAL	1- 8	1 3/4	+ 1/4	+16.6
A	DCL INC	1- 1	1	+	+6.6
N	OPF INC	5- 8	7 3/4	- 3/8	-4.6
N	ITEL	6- 16	15 3/8	- 1/8	-0.8
N	LEASCO CORP	6- 22	20 3/4	- 3/4	-3.4
O	LEASPAC CORP	0- 1	3/4	0	0.0
O	NRG INC	0- 1	1/8	- 3/16	-24.8
A	PIONEER TEX CORP	6- 9	8 3/8	+ 1/4	+3.0
N	U.S. LEASING	7- 12	11 7/8	+ 7/8	+7.9

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		PRICE 1976-77 RANGE (1)	CLOSE JAN 26 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 3	1 7/8	+ 1/8	+7.1
O	ANACOMP INC	6- 11	8 1/4	+ 1/2	+6.4
A	APPLIED DATA RES.	2- 7	6	+ 1/4	+4.3
N	AUTOMATIC DATA PROC	17- 35	25 3/4	-2 1/8	-7.6
O	COLEMAN AMERICAN COS	2- 6	2	- 1/4	-11.1
O	COMPU-SERV NETWORK	3- 15	13 3/4	- 1/4	-1.7
O	COMPUTER DIMENSIONS	3- 7	6 5/8	+ 1/8	+1.9
O	COMP ELECTION SYSTMS	5- 9	6 1/2	0	0.0
O	COMPUTER HORIZONS	1- 2	1 1/4	0	0.0
O	COMPUTER NETWORK	2- 8	6 7/8	- 3/8	-5.1
N	COMPUTER SCIENCES	4- 9	8 1/4	- 1/2	-5.7
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER USAGE	2- 6	2 1/2	+ 1/8	+5.2
O	COMSHARE	2- 9	6 1/2	+1 1/4	+23.8
O	DATA DIMENSIONS INC	2- 5	4 3/8	+ 1/4	+6.0
O	DATATAB	1- 2	1 3/8	0	0.0
N	ELECTRONIC DATA SYS.	12- 18	17 3/8	- 3/8	-2.1
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	INSYTE CORP	1- 3	2 1/2	+ 1/8	+5.2
O	IPS COMPUTER MARKET.	1- 2	3/4	0	0.0
O	KEANE ASSOCIATES	2- 4	2 1/2	0	0.0
O	KEYDATA CORP	1- 5	2 1/8	+ 3/8	+21.4
A	LOGICON	3- 8	8	+ 1/4	+3.2
A	MANAGEMENT DATA	1- 3	1 1/2	+ 1/8	+9.0
A	NATIONAL CSS INC	13- 25	22	-1 3/4	-7.3
O	NATIONAL DATA CORP	4- 7	5 5/8	- 1/4	-4.2
A	ON LINE SYSTEMS INC	17- 23	21 1/4	+1 1/4	+6.2
N	PLANNING RESEARCH	3- 5	4 1/2	+ 1/4	+5.8
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 5	2 3/8	0	0.0
O	REYNOLDS & REYNOLD	13- 21	19 1/2	0	0.0
	SCIENTIFIC COMPUTERS	1- 1	1 7/8	+ 7/8	+87.5
	TYMSHARE INC	14- 28	18	- 1/2	-2.7
	URS SYSTEMS	3- 5	3 7/8	0	0.0
	WYLY CORP	1- 7	1 5/8	- 3/8	-18.7

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1976-77 RANGE (1)	CLOSE JAN 26 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	8- 14	13 7/8	+ 1/4	+1.8
O	ADVANCED MEMORY SYS	4- 10	8	0	0.0
N	AMPEX CORP	5- 10	9 1/8	- 1/4	-2.6
O	ANDERSON JACOBSON	2- 4	3 1/4	0	0.0
O	APPLIED DIG DATA SYS	13- 25	14 1/4	-1 3/4	-10.9
O	BEEHIVE MEDICAL ELEC	3- 12	11 1/2	+1	+9.5
A	BOLT,BERANEK & NEW	7- 11	7 3/4	- 1/8	-1.5
N	BUNKER-RAMO	5- 10	10 1/4	+1	+10.8
A	CALCOMP	4- 7	4 1/2	- 1/8	-2.7
O	CAMBRIDGE MEMORIES	0- 6	1 3/8	-	-4.1
N	CENTRONICS DATA COMP	20- 36	25 3/8	- 3/8	-1.4
O	CODEX CORP	22- 42	36	-1 1/2	-4.0
O	COGNITRONICS	1- 1	1 1/8	0	0.0
O	COMPUTER COMMUN.	1- 6	5 7/8	0	0.0
O	COMPUTER CONSOLES	4- 7	4 3/4	0	0.0
A	COMPUTER EQUIPMENT	1- 3	2	0	0.0
O	COMPUTER TRANSCEIVER	1- 3	1 1/4	+ 1/4	+25.0
O	COMTEN	4- 13	12 3/8	+1 1/8	+10.0
N	CONRAC CORP	20- 27	24 1/4	- 5/8	-2.5
O	DATA ACCESS SYSTEMS	1- 5	5 1/4	+1	+23.5
O	DATA 100	6- 13	7 3/8	- 1/4	-3.2
A	DATA PRODUCTS CORP	5- 15	11 3/8	- 3/4	-6.1
O	DATA TECHNOLOGY	1- 3	3 1/8	- 1/8	-3.8
O	DATUM INC	1- 2	1 1/4	0	0.0
O	DECISION DATA COMPUT	1- 4	1 3/4	- 1/8	-6.6
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
N	ELECTRONIC M & M	1- 4	4 3/8	0	0.0
O	FABRI-TEK	1- 1	1 1/8	+	+5.8
O	GENERAL COMPUTER SYS	0- 2	1/2	0	0.0
N	HAZELTINE CORP	4- 12	11 1/4	- 1/8	-1.0
N	HARRIS CORP	29- 57	34 3/8	+1 1/2	+4.5
A	INCOTERM CORP	9- 20	12 1/2	- 1/4	-1.9
O	INFOREX INC	3- 7	6 3/4	+ 7/8	+14.8
O	INFORMATION INTL INC	10- 18	11 7/8	-1 5/8	-12.0
O	INTEL CORP	47-109	54	-2	-3.5
A	LUNDY ELECTRONICS	3- 7	4 3/4	+ 1/8	+2.7
O	MSI DATA CORP	3- 8	7 1/2	+1 1/4	+20.0
N	MILGO ELECTRONICS	15- 28	27 1/2	+5 7/8	+27.1
N	MOHAWK DATA SCI	3- 10	7 1/8	- 1/8	-1.7
O	PENRIL CORP	1- 3	2	0	0.0
A	PERTEC CORP	3- 9	8 3/8	+ 3/8	+4.6
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 10	2	+ 1/2	+33.3
O	QUANTOR CORP	4- 6	5	+ 1/4	+5.2
O	RECOGNITION EQUIP	6- 11	9 7/8	+ 1/2	+5.3
N	SANDERS ASSOCIATES	6- 11	10 7/8	+ 1/4	+2.3
O	SCAN DATA	1- 4	1 3/8	0	0.0
O	STORAGE TECHNOLOGY	9- 13	12	- 1/4	-2.0
O	T BAR INC	5- 10	7 1/8	0	0.0
O	TALLY CORP.	4- 6	5 1/8	- 1/4	-4.6
O	TEC INC	3- 9	8 3/4	+1 1/4	+16.6
N	TEKTRONIX INC	45- 69	59	- 1/2	-0.8
N	TELEX	2- 5	3 1/8	- 1/4	-7.4
O	WANGCO INC	11- 22	17 1/2	0	0.0
O	WILTEK INC	1- 2	1/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1976-77 RANGE (1)	CLOSE JAN 26 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED SYSTEMS INC	1- 4	3 1/4	0	0.0
O	BALTIMORE BUS FORMS	3- 5	3 1/4	- 1/4	-7.1
A	BARRY WRIGHT	6- 11	10 5/8	- 1/8	-1.1
O	CYBERMATICS INC	0- 1	5/8	0	0.0
A	DATA DOCUMENTS	25- 45	41	0	0.0
O	DUPLEX PRODUCTS INC	13- 24	14 1/4	0	0.0
N	ENNIS BUS. FORMS	6- 8	6 1/8	0	0.0
O	GRAHAM MAGNETICS	8- 13	11 3/4	+ 1/4	+2.1
O	GRAPHIC CONTROLS	13- 19	16	- 1/2	-3.0
N	3M COMPANY	52- 66	51 7/8	-1 1/8	-2.1
O	MOORE CORP LTD	32- 51	32 3/4	-1 3/4	-5.0
N	NASHUA CORP	11- 20	17 1/2	- 1/8	-0.7
O	STANDARD REGISTER	15- 19	18 1/2	0	0.0
O	TAB PRODUCTS CO	5- 16	16 1/4	+1 1/4	+8.3
N	UARCO	19- 25	21 7/8	0	0.0
A	WABASH MAGNETICS	4- 12	11 1/2	- 1/4	-2.1
N	WALLACE BUS FORMS	19- 25	20 5/8	- 1/4	-1.1

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